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FOREWORD

The Straub Clinic takes pleasure and pride in contributing the material for this issue of *The American Surgeon*. Our organization was founded in 1920 by a surgeon, Dr. George F. Straub, a graduate of Wurzburg and Heidelberg Universities in Germany, who came to Hawaii to practice in 1908. He was joined in 1922 by Dr. Joseph E. Strode, who has been chief of our Department of Surgery since Dr. Straub's retirement in 1933.

We now have five general surgeons, and separate departments of urology, orthopedics, gynecology and obstetrics, ophthalmology, otolaryngology and neurosurgery. Most of these, plus the departments of medicine, pediatrics and radiology, have contributed to the preparation of this issue.

HARRY L. ARNOLD, JR., M.D.
Guest Editor

SURGERY IN HAWAII, 1916–1960

J. E. Strode, M.D.

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The members of the Straub Clinic having assumed the responsibility for an issue of *The American Surgeon*, it has occurred to me that perhaps its readers would be interested in learning about peculiarities of medical practice as encountered in the new state of Hawaii.

I arrived in Hawaii in June 1916, to be on the house staff of The Queen's Hospital. I had completed a surgical internship in Barnes Hospital in St. Louis. The Queen's Hospital was recognized then, and has continued to be recognized over the ensuing years, as the medical center of the Hawaiian Islands. Imagine my surprise and consternation to find on my arrival that The Queen's Hospital had no laboratory! There were a few test tubes and reagents in a room set aside for this purpose, but no one knew how they should be used. Urinalyses and simple blood counts by the interns covered the extent of laboratory investigations. Specimens removed in surgery were reviewed macroscopically and then consigned to the garbage can. There was a small induction coil x-ray machine, capable (on a clear day, with the wind in the right direction) of outlining the smaller bones, or even of showing them to be fractured if the fragments were sufficiently separated.

The practice of medicine was indeed on a clinical basis, and the decision to take a history and perform a physical examination was not based on laboratory findings. It may be a bit surprising to the younger generation to know that the vast majority of patients were correctly diagnosed and adequately treated. Dr. James Judd, one of Hawaii's leading surgeons at the time of my arrival, always ascribed the usually smooth postoperative course of his cases to our salubrious climate. He always encouraged early ambulation and a daily dose of sunshine, especially in cases with infection, and the wards had the usual quota of osteomyelitis, cellulitis, pneumonia, lung abscess and the like.

Amebic dysentery was frequently seen, and a complicating liver abscess was not uncommon. In fact, it was the most likely diagnosis when a patient complained of pain in the right upper quadrant associated with fever and leukocytosis. Simple aspiration of such abscesses had not as yet been advocated, and many patients subjected to open drainage succumbed to secondary infection. The most effective treatment for amebic dysentery locally had long been known to be a kerosene enema. Although no untoward effects had been known to occur, I always advised the orderly to keep the patient a safe distance from an open flame.

From the Straub Clinic, Honolulu, Hawaii.

At that time a large number of Filipino laborers were being imported to work on the sugar plantations, and since their diet was composed mostly of polished rice, many cases of beriberi were seen. A common diagnostic procedure was to place a broomstick on the floor and if the patient was unable to jump over it, he was assumed to have beriberi.

Having had my training in St. Louis, where cases of malaria were frequently seen and diseases of the thyroid, particularly toxic goiter, were fairly common, I was surprised to learn that for all practical purposes neither one of these conditions was met in Hawaii. An occasional case of malaria was imported but was not transmitted to others because of the absence of the Anopheles mosquito.

Over the years, the situation as regards diseases of the thyroid has changed radically. In the early 1920's, we first began to see diffuse toxic thyroids, occurring almost always in our young female Orientals, usually Japanese, less frequently in Chinese, because they are fewer. Over the ensuing years, an increasing number of cases of the entire gamut of thyroid diseases has appeared in our local population. For some unknown reason, however, toxic nodular goiter continues to be a rarity. In the last few years, various types of acute and chronic thyroiditis have become quite prevalent. No one has come forward with any convincing evidence to explain why thyroids in this area have acted in this fashion.

So far as anyone knows, St. Patrick has never visited these islands, but we are free of snakes. Antisnake venom, therefore, is not found among the local pharmaceuticals. Rabies has never

occurred in Hawaii, and therefore, a rigid quarantine of four months is maintained for all imported animals that are known to disseminate this disease.

Leprosy has long been endemic in Hawaii. At the turn of the century, it was of considerable importance medically, but perhaps more important politically. It is dying out because of isolation of open cases and the use of sulfones. Kalaupapa, the leprosy settlement on the Island of Molokai, famed largely because of Father Damien and the consecration of his life to the inmates suffering from this disease, is receiving no new patients. I am told that it continues to exist only because it is home for those who live there and who would have nowhere to go if the settlement was discontinued.

Tuberculosis here, as in the continental United States, is definitely on the wane. At the time of my arrival, tuberculosis involving the spine, hip and genitourinary organs was of common occurrence, and the concern of all doing surgery. I vividly recall diagnosing a case as probably tuberculosis of the kidney. Not having a cystoscope or other means of determining which side might be involved or even whether the patient had two kidneys, I explored first the side least suspected. This kidney, so far as we could tell from its external appearance, was normal, so the opposite kidney, definitely involved, was removed. The patient made a good recovery and was relieved of her symptoms, to live in comfort for many years.

Hawaii is frequently referred to as the melting pot of the world so far as races are concerned. This appellation is well placed; considering the size of Hawaii, I am sure we have more people of different racial extraction than any other spot in the world. This has afforded opportunity for the studying of diseases peculiar to various ethnic groups. From the surgical point of view, our most significant observations concern our Japanese. Approximately 40 per cent of our population is of Japanese ancestry, and in this group we have found that cancer of the breast is of infrequent occurrence, whereas cancer of the stomach occurs from two and one-half to three times more frequently than in any other race. No one, so far, has offered any plausible reason to explain this racial susceptibility to these diseases. It is a well-known fact that more Japanese women nurse their offspring on the breast, and do it for a longer period of time, than do other races, and this has been offered as a possible explanation of the infrequency of breast cancer. In a study of breast tumors coming to surgery[1] in Hawaii, I found that fibrocystic disease was relatively infrequent in the Japanese, and that fibroadenoma was the most common benign lesion encountered. Some observers believe that fibrocystic disease is a precursor of mammary malignancy. Our frequent exposure to the problem of cancer of the stomach and the appallingly unsatisfactory results after any type of therapy for this condition once the diagnosis is made clinically have focused our attention on the advisability of removing all ulcerating lesions of the stomach once such a diagnosis has been made.[2] I believe this represents a sane approach to the problem, not only in Hawaii but in the continental United States, when all of the aspects of this problem are given mature consideration.

These peculiarities surrounding the practice of medicine in Hawaii are, I believe, the most outstanding. I would not want to conclude this brief résumé of this subject without assuring the readers that we have kept pace with the progress of medicine in our mother country. Our hospitals are modern and our nurses well trained, and most of our physicians are returning after completing residencies in the outstanding medical centers of the mainland United States.

Having recently attained the status of Statehood and the right of franchise, we are no longer contemplating a second Boston Tea Party or disturbed further by the thought that "taxation without representation is tyranny." It is hoped that as our geographic location becomes more generally known, more people will realize we have the same monetary standards, are subjected to the same taxes and have the same postal regulations as are applied to our sister states. Over the years we have become a bit resentful of the rather widely held belief that we live in a foreign country. Being American surgeons, we therefore consider it quite appropriate that we contribute an issue to *The American Surgeon*.

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TOTAL GASTRECTOMY

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Total gastrectomy in the treatment of malignancy of the stomach is an accepted procedure under certain circumstances. Although it was formerly thought by some to be perhaps advisable in all cases, experience has proven this to be a fallacious conclusion. Less radical operations in most instances result in equally good palliation or five-year survival, even occasionally an apparent cure, with less mortality and fewer patients with disabling postoperative sequelae.

Total gastrectomy for a benign lesion is rarely justified. It is occasionally done when the surgeon concludes erroneously that he is dealing with a malignancy which is later proven to be benign. It may be the only method of completely removing multiple polyps of the stomach, which are now recognized to be precursors of malignancy. In a single instance in our experience, the stomach was removed for a benign lesion because of extensive hypertrophic gastritis associated with severe hemorrhages (figs. 1 and 2). A less radical operation, we thought, would not be effective. Postoperatively, we were encouraged to believe that the correct decision had been made because the patient gained weight and felt much improved. Unfortunately, he left the Islands and has been lost to further observations. Total gastrectomy has been used after repeated recurrences of ulcers after partial removal of the stomach, although this may occur less frequently in the future, since we now know that some pancreatic tumors are responsible for such recurrences.

Our series of cases of total gastrectomy is small, and results of surgery for the most part quite disappointing. The operation has been done for advanced malignancy where it was obvious that a less radical operation would not have removed all malignant tissue that was visible or palpable. Several cases that appeared suitable for the operation were later recognized to be palliative in nature after the operation had proceeded too far to allow retreat. I am now convinced, as others have been, that total gastrectomy is of too great magnitude and productive of too few benefits to be used for palliative purposes unless it is done for obstructive symptoms, either pyloric or cardiac, not amenable to a less radical operation.

Since November 1943, we have done 47 total gastrectomies for carcinoma and during this time we have subjected 315 patients with carcinoma of the stomach to surgery. Of the 47 total gastrectomies for malignancy, 34 were done on Japanese, 15 (46 per cent) of whom were women. The oldest patient was 78 years of age, the youngest 27, the average age 60. Two patients are living, one without evidence of recurrence after 6 years and 3 months and one after 6 weeks; the others have died. Eight died in the immediate postoperative period. The average length of life of those surviving the immediate operation was somewhat over 1 year. One patient lived 2 years and 3 months, one 2 years and 6 months, one 2 years and 7 months, and one 5 years and 3 months.

CASE REPORTS

Recital of a few of the problems encountered in the more unusual cases may prove interesting, perhaps instructive.

The youngest person, a woman of 27, was bothered with epigastric distress, nausea and vomiting during pregnancy. The symptoms were attributed to the pregnancy. When they persisted after delivery, a gastrointestinal study revealed marked deformity compatible with a diagnosis of malignancy of the stomach.

One woman of 57, with epigastric distress of several months' duration, showed an ulcerating lesion of the lesser curvature of the stomach by x-ray study. The removed stomach showed multiple superficial ulcerating lesions of the mucosa. There was much difference of opinion among our local pathologists as to the diagnosis. Some favored inflammatory carcinoma, others carcinoma *in situ*. The perigastric lymph nodes were negative. Later the patient developed several skin lesions, one of which was excised and on microscopic examination was reported to show lymphosarcoma. One year after gastrectomy, while lying in bed, the patient fractured her tibia. X-ray study revealed multiple osteolytic lesions of various bones. Later autopsy showed

FIG. 1. X-ray showing extensive hypertrophic gastritis.

lymphosarcoma involving the cervical and axillary lymph nodes. No involvement of the visceral organs or abdominal or hilar lymph nodes was found. There were multiple bony metastases. A recent review of the original gastric sections by Dr. Tilden, pathologist at the Straub Clinic, and Drs. Civin and Tamura, pathologists of The Queen's Hospital, resulted in their agreeing that the lesion of the stomach was lymphosarcoma involving the gastric mucosa without infiltration of the wall or involvement of the perigastric nodes.

One of our two living patients, after total gastrectomy, illustrates several points that I believe are worthy of discussion. A Japanese man, aged 68, was first seen at the Straub Clinic on October 13, 1953, because he had just vomited a considerable amount of dark blood. He gave no history otherwise of being ill. His alcoholic intake had apparently been moderate; his appetite was good; and he had lost no weight. Physical examination was negative. A gastrointestinal study showed the esophagus to be normal with no evidence of varices; there was moderate tortuosity of the gastric antrum and a general picture indicating hypertrophic gastritis. No mucosal deformity was seen. Laboratory studies of hepatic function were within normal limits. With the history of vomiting blood, the gastrointestinal study suggesting abnormality of the stomach, and the patient being of a race (Japanese) in which malignancy of the stomach is so prevalent, exploration of the abdomen seemed advisable.

FIG. 2. The specimen removed at operation.

This was done on October 16, 1953. Extensive induration and thickening of the gastric wall were found, indicating that we were dealing with a linitis plastica type of malignancy. The cardiac portion of the stomach grossly seemed to be free of involvement. The omentum, the gastrohepatic mesentery and the lymph nodes along the lower esophagus and lesser curvature of the stomach were removed along with a high gastric resection. Grossly, the site of resection of the stomach seemed well above the lesion, but microscopic examination revealed carcinoma cells at the site of resection. It seemed inadvisable to attempt to save any of the stomach, so the remainder of this organ, along with the lower end of the esophagus, the spleen, and tail of the pancreas, was removed. Subsequent examination of the removed specimen showed no extension of the lesion beyond the gastric wall. This patient, now five years and five months after operation, remains well-nourished and seems in good health without evidence of recurrence.

DISCUSSION

No one, I feel sure, is enthusiastic about the treatment of carcinoma of the stomach. This is particularly so when it is recognized at the time of operation that total gastrectomy is the only alternative one has if anything helpful to the patient is to be attempted. Such heroic efforts as total gastrectomy, which should always be combined with removal of the spleen, omentum, gastrohepatic mesentery and, frequently, contiguous structures, such as part of the pancreas, left lobe of the liver or a section of colon, are rarely very rewarding to either patient or surgeon.

Postoperative morbidity after total gastrectomy is frequent and often distressing; mortality is relatively high; and long survival of the patient in comfort is exceptional. Most

persons undoubtedly have had their lesion for a considerable period of time, and although, grossly, there may seem to be little or no extension outside the stomach, cancer cells undoubtedly have become widely disseminated by the lymphatics and blood stream in addition to direct extension.

This is particularly true, we have found, in the linitis plastica or leather bottle type of lesion. Approximately one-third of the cases fell into this classification. This type of lesion apparently grows slowly but insidiously, producing few early symptoms. It infiltrates the gastric wall, causing much thickening, and may show little evidence of spread into the perigastric lymph nodes. Grossly, the infiltration may seem to stop short of the duodenum or esophagus, but only by microscopic examination can this be determined with any degree of accuracy (figs. 3 to 5). Positive findings along the line of resection on frozen section indicate the necessity for wider removal, although negative findings by

FIG. 3

FIG. 4

FIG. 5

FIGS. 3 to 5. Showing linitis plastica type of malignancy. In these cases the terminal esophagus and proximal duodenum are likely to be involved. Frozen section is helpful in determining how much of the esophagus and duodenum should be removed.

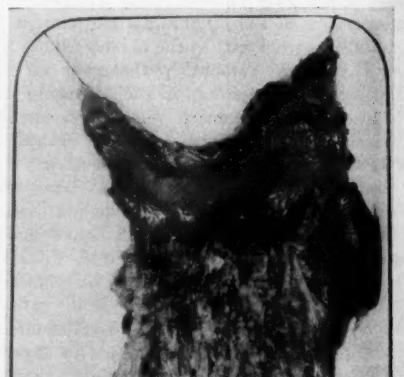

FIG. 6

FIG. 7

FIGS. 6 and 7. These photographs show lesions arising in the cardiac end of the stomach.

no means prove that the line of resection is beyond the area of involvement.

In most of the other cases, the lesion arose in the more proximal part of the stomach. Here again symptoms may be late in developing because there is comparatively little interference in the beginning with gastric function (figs. 6 and 7). For this reason, it is well to bear in mind that anyone complaining of continuing epigastric distress deserves repeated examination, if the initial study is equivocal.

RESTORATION OF CONTINUITY

Considerable literature has accumulated dealing with the problem of how best to reconstruct esophagointestinal continuity after total gastrectomy. Segments of both large and small intestine have been used to bridge the gap between the terminal esophagus and the duodenum. The main objectives to be accomplished by these substitution methods have been (1) to form an adequate food reservoir, (2) to prevent esophagitis and (3) to permit the food to pass through the duodenum in a normal manner.

A recent article by Herrington,[2] comparing results with Billroth I and Billroth II types of reconstruction after gastric resection, adds emphasis to the observations of others that better nutrition and fewer dumping symptoms follow the Billroth I type of anastomosis. However, McCaughan and Bowers[5] compared results of 100 Billroth II operations with a large stoma with 100 Billroth II operations with a small stoma, and found that postgastrectomy dumping symptoms and weight loss were much less in the latter series. They considered the optimum size of stoma to be from 1.5 to 2.5 cm. in diameter, or one that would admit an index finger after completion of the anastomosis. Stomas of this size are supposed to prevent rapid emptying of the remaining stomach which results in overdistension of the jejunum.

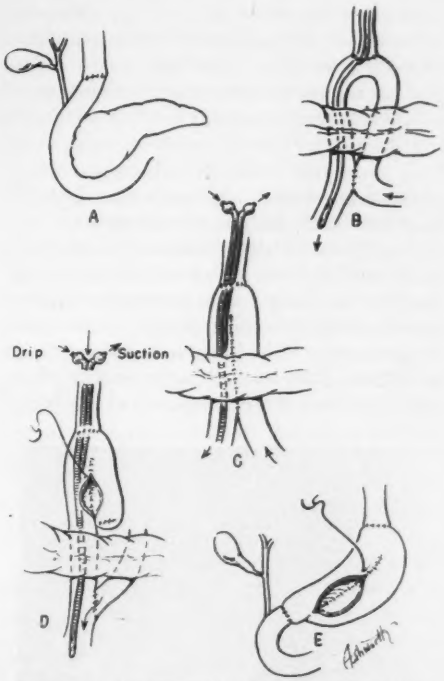

FIG. 8. *A*. Anastomosis of esophagus to duodenum. *B*. A small enteroenterostomy between the loops of jejunum anastomosed to the esophagus. This helps but does not prevent the secretions into the duodenum from bathing the lower end of the esophagus. *C*. This method of performing an enteroenterostomy gives a more adequate food pouch. *D*. This method of esophagojejunal anastomosis forms an adequate food pouch and if the opening is placed into the jejunum for the admission of duodenal content more distally, esophagitis is less likely to occur. Hunt's method of interposing a segment of jejunum between the esophagus and duodenum and the construction of a food pouch is probably preferable to other methods that have been used. It has the disadvantage of adding considerably to an already lengthy operation.

We have not interposed a segment of intestine between the esophagus and duodenum in any of our cases, but this method perhaps has merit. Merendino and Thomas[6] have further added to the knowledge of the value of jejunal interposition for substitution of esophagogastric sphincter in the prevention of esophagitis. Claude Hunt[3] has devised and reported favorably on a method of fashioning an adequate food pouch out of a segment of jejunum to unite the esophagus with the duodenum. This appears to me to be the best method to replace the stomach so far suggested.

Reference to figure 8, *A* to *D*, shows the methods of re-establishing esophagointestinal continuity we have used. The double lumen tube, as shown, has been used routinely, and I believe it has advantages. It keeps the esophagus and the attached jejunum decompressed, meanwhile permitting fluids, electrolytes, antibiotics, vitamins, and so forth, to be introduced into the intestine beyond the line of anastomosis.

One of the methods of forming a food reservoir, as advised by Hunt, is shown in figure 8*D* with the Roux-en-Y principle of having the duodenal content empty into the jejunum a considerable distance away from the anastomosis with the esophagus. This minimizes the danger of regurgitation and the development of esophagitis from the irritating effects of bile and pancreatic secretions. This method was used in our longest surviving case, and figures 9 and 10 show the stomach x-rays before operation and the food reservoir that has been created. The patient has remained free of epigastric distress. Figure 8*E* shows one method of interposing a segment of jejunum between the esophagus and duodenum, which has been used by Hunt with satisfactory results. The same principle of folding the jejunum on itself and doing an enteroenterostomy as in figure 8*D* is used.

FIG. 10. X-ray of food pouch created by method *D* in figure 8.

FIG. 9. X-ray of stomach before removal.

MORTALITY

Mortality after total gastrectomy has been reduced greatly over the years by many improvements in surgery, with which everyone is familiar. Finney and Rienhoff,[1] in 1929, reported 67 cases with a mortality of 53.8 per cent. At the Mayo Clinic,[8] from 1917 to 1935, the mortality was 68.4 per cent, whereas from 1950 to 1954, it was 16.4 per cent. Nakayama[7] of the University of Chiba, Japan, reported 422 cases with 3.3 per cent death rate within 1 month of surgery. Although I have not visited Nakayama's clinic, those who have report that he has amazing surgical dexterity. Whether he uses total gastrectomy routinely or in selected cases only is

FIG. 11. Specimen removed at operation which includes the entire stomach, sections of attached esophagus and duodenum, the spleen, part of the crura of the diaphragm, tail of the pancreas, a section of the transverse colon and omentum.

not clear. He attributes his success to the special technique of using supportive sutures at the site of anastomosis. Before applying this method, his postoperative death rate was 14.8 per cent.

At the Lahey Clinic, Marshall[4] reported 246 total gastrectomies with an operative mortality of 8.2 per cent over a 10-year period. During this time, 20 to 30 per cent of all patients who had resections for gastric carcinoma had total removal of the stomach.

In our own experience, the mortality has been around 17 per cent, which I believe is higher than it should be. Attempting such a major operation in elderly persons, especially when otherwise they are not a good surgical risk, is not good surgical judgment. One of our patients died on the operating table from air embolism resulting from air being pumped into the venous system after a blood transfusion had been completed. One person died of a leak of the anastomosis, and another was thought to have had this complication.

PRECAUTIONS

We have found it advisable to prepare the large intestine with antibiotics preoperatively in all cases of malignancy of the stomach that appear to be extensive. The mesentery of the transverse colon around the middle colic artery or the colon itself may be involved with malignancy, necessitating its resection. In one case, total gastrectomy was combined with a Whipple operation, since the carcinoma was found to have grown into the head of the pancreas without evidence of extension elsewhere. In two others, the midportion of the pancreas was involved by extension of the malignancy. This area was resected and the tail of the pancreas was anastomosed to the jejunum.

The tail of the pancreas has been resected in several cases. Figure 11 shows a removed specimen which includes the stomach, omentum, spleen, tail of the pancreas, section of the transverse colon, part of the diaphragm and part of the left lobe of the liver. Several of our cases developed a subphrenic abscess on the left which had to be drained. I believe it to be advisable to drain this area in all cases of total gastrectomy at the time of operation. This is particularly desirable when the pancreas has been resected. Pancreatic enzymes mixed with serum and blood clots seem to supply a medium well suited to the development of an abscess.

POSTOPERATIVE CARE

All patients surviving total gastrectomy are in need of continuous supervision. They are prone to develop nutritional disturbances. They not infrequently suffer for a time at least with postgastrectomy or dumping symptoms and they usually develop anemia. All of these distressing and disturbing symptoms can be helped or prevented with proper supervision. Nakayama reports his best results after the insertion of a loop of jejunum between the esophagus and the duodenum. This method delayed but did not prevent the development of postoperative anemia, which, after three years, became apparent in all patients.

Because of the loss of gastric function which serves to macerate and mix ingested food, the patient must masticate his food thoroughly and eat slowly and frequently. A high caloric, high fat, high protein, low carbohydrate diet is generally considered best for such persons. Although carbohydrates seem well assimilated, it has been found that they contribute to the dumping syndrome. Fluids, particularly those containing carbohydrates, should be specifically curtailed during mealtime.

Anemia after partial gastric resection is not uncommon; after total gastrectomy it probably occurs universally in those who survive long enough for it to develop, and the commonest type found is the hypochromic, normocytic variety. This has been ascribed to the removal of hydrochloric acid-producing tissue with poor

absorption of iron. In some patients the macrocytic, megaloblastic type of anemia has been found to develop though usually at a later time. Most patients have been found to be greatly improved by proper use of vitamin B_{12} and folic acid.

SUMMARY

It is believed that total gastrectomy is justifiable, not as a routine procedure in the treatment of gastric malignancy, but in well selected cases. It is an operation of magnitude and therefore should not be attempted in patients who are poor surgical risks or by surgeons unfamiliar with the problems involved. It should be used only in case a less radical operation obviously does not remove all grossly involved tissue.

Total removal of the stomach, except for malignancy, is rarely justified. Frequently it brings about distressing complications not lending themselves to easy solution. It is an operation bringing comfort to few patients and even fewer for any great length of time. For the surgeon, it is a surgical exercise after which he rarely gains much satisfaction. It is a desperate effort to be of service to the unfortunate victim.

Surely the time must not be far distant when we will not be called upon to implement such heroic measures that in most cases prove to be so unrewarding.

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A TECHNIQUE OF PROFUNDUS TENDON REPAIR: PRELIMINARY REPORT

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Uniformly successful results in the treatment of lacerations of the profundus tendons distal to the palm are still not generally obtained, no matter what technique is used. As can be expected when results are not consistent, many different methods of joining the lacerated ends have been devised. One therefore hesitates to add still another technique to this long list. However, it is felt that there are certain advantages in the method here described.

The established principles of dealing with lacerated flexor tendons are observed. The repair is always made in a hospital under general anesthesia, in a bloodless field. No attempts at primary repair are made in wounds over eight hours old, in those that are badly contused, or in those with such extensive loss of soft parts that the tendon cannot be adequately covered.

Most lacerations of the flexor tendons occur when a sharp object, such as a knife, sheet of metal or sharp glass slips through the flexed fingers. The resulting laceration of the finger occurs somewhere between the palmar crease and the distal interphalangeal crease, usually at or near the first interphalangeal joint. The proximal part of the tendon retracts into the palm and the distal one recedes toward the tip of the finger when the digit is extended as shown in figure 1*A*.

Failure of restoration of function with modern methods of suture results less often from separation of the tendon ends than from dense adhesions forming between the damaged tendon and the damaged sheath. The technique presented here minimizes this damage to the tendon and sheath and, therefore, minimizes adhesions. The method has restored function almost completely in five cases so treated.

After the hand and forearm have been thoroughly scrubbed, the tourniquet applied and the wound cleansed with copious amounts of saline, a short transverse incision is made in the palm, 2 cm. proximal to the distal palmar crease, and the profundus tendon of the involved phalanx is drawn out through a transverse incision in the tendon sheath. If the laceration is anywhere opposite the first phalanx, and the sublimis is also lacerated, the sublimis is deliberately sacrificed by pulling it out through the palmar incision, applying traction and cutting as much off as possible. The insertion of the sublimis is carefully removed through the wound of trauma, if possible, or through another appropriate transverse incision in the sheath. A pull-out wire (after the method of Bunnell) is then placed in the proximal end of the profundus tendon. This pull-out wire is threaded through the slit in a probe, passed distally through the tendon sheath and out the wound of trauma (fig. 1*B*). The pull-out wire is then threaded through an extra long, straight needle which is passed distally through the tendon sheath, out through the tip of the finger as close to the nail as possible, and tied over a button. No attempt is made actually to suture the cut ends of the tendon. Healing will occur from simple apposition (fig. 1*C*).

The transverse laceration in the tendon sheath is then closed; one suture is almost always adequate. If the laceration of the profundus is beyond the insertion of the sublimis, this tendon is not sacrificed. So far, we have been able to thread the probe through the normal slit in this tendon (fig. 1*D*).

The hand is placed in a splint in the position of function, and minimal active motion begun at once. This is continued for 3 weeks, at which time the pull-out wire is removed.

DISCUSSION

It is believed that this method results in minimal trauma to the tendon sheath and requires minimal handling of the lacerated tendon. It can be done very rapidly and has, in our hands, restored function much more nearly completely than any other method used.

So far, no case has been subjected to surgery to release adhesions.

In case reoperation is necessary, we believe that since minimal damage has been done to the

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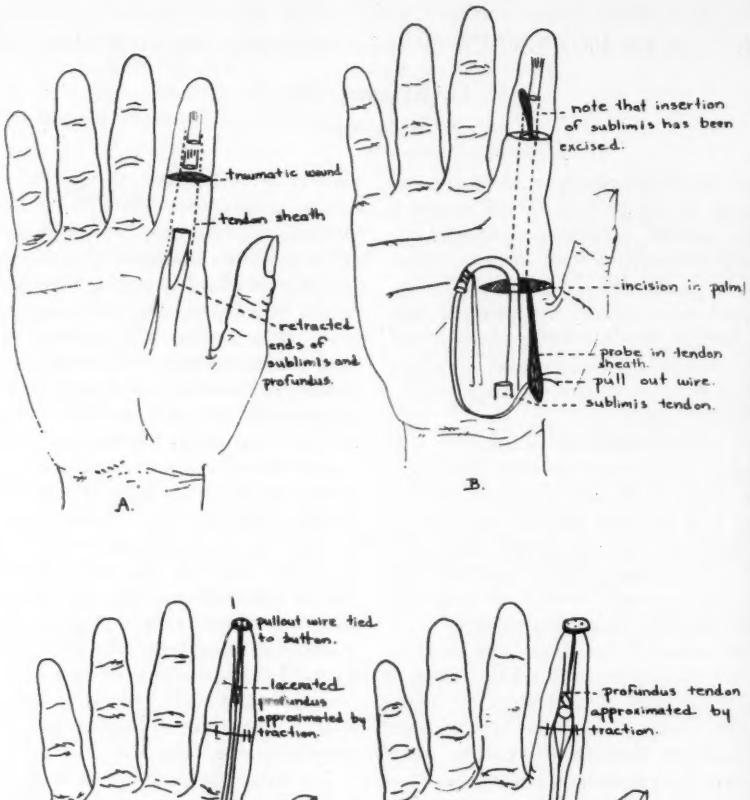

FIG. 1. *A*. Usual site of trauma and retraction of tendons. *B*. Incision in palm. Bunnell pull-out wire has been threaded through a probe which is in the tendon sheath. *C*. Approximation of cut tendon ends, and all wounds sutured. *D*. Repair when profundus is lacerated distal to the insertion of the sublimis: sublimis tendon can then be preserved.

tendon sheath, there will be a minimum of dense adhesions. This means that only a small piece of grafted gliding membrane will be necessary to relieve these adhesions, and a good result can be expected. It is realized that too few patients have been treated by this technique to draw any definite conclusions, but the results so far have been extremely promising.

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GASTRIC CARCINOMA: MULTIPLE VISCERAL RESECTION IN AN UNUSUAL CASE OF LONG-TERM SURVIVAL

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Survival for over seven years, of a patient with a recurrent gastric carcinoma, is most unusual. Such a patient recently presented himself to us for the treatment of complications of a malignancy arising in the stomach. The lesion was seen in an advanced state seven years previously, and evidence suggested that it was present as long ago as ten years. In spite of this, the malignancy was localized, and although multiple upper abdominal viscera were involved, it was technically possible to resect all of the gross lesion for the second time seven years after it was primarily resected by radical gastrectomy. So many of the questions pertinent to gastric cancer are roused in the study of this single case that we felt it worthy of reporting.

CASE REPORT

A 28-year-old Japanese man was first seen on July 6, 1949, complaining of epigastric pain of 2 years' duration and recent anorexia. He weighed 127 pounds. A gastrointestinal barium study (fig. 1) revealed a flat shallow ulcer of the lesser curvature with moderate atrophic gastritis. Repeat film 1 week later confirmed the findings. Conservative therapy was recommended; the patient improved rapidly and did not return until April 27, 1950, at which time recurrence of the same symptoms was reported. A repeat gastrointestinal series on May 1, 1950, failed to reveal the previously demonstrated ulcer. Gastroscopy on May 24, 1950, showed on the lesser curvature, anterior wall, a small linear ulceration with a definite induration around it. The gastroscopist stated his findings might represent early ulcerative carcinoma. Gastrectomy was refused. Cytologic study of the gastric contents failed to reveal suspicious cells.

On July 7, 1952, 2 years later, the patient returned still complaining of the same symptoms, and again, a small superficial ulcer was demonstrated along the lesser gastric curvature. Subtotal gastric resection on July 21, 1952, disclosed a grade IV adenocarcinoma of the stomach, type C (Duke's) (diffuse fibrosing carcinoma). Of the 11 lymph nodes examined, 1 contained metastatic tumor.

The patient made an uneventful recovery. He returned annually for follow-up. He had mild gastrointestinal complaints but maintained his weight at about 125 pounds and worked regularly as a carpenter. Gastrointestinal series in 1956 and 1958 were reported to be essentially negative.

He returned on October 3, 1959, complaining of progressive difficulty in swallowing for about a week. Barium swallow revealed a marked hesitation and delay in flow from the esophagus into the remaining stomach (fig. 2) and a string-like barium shadow indicating an organic stenosis at the esophagogastric junction. Within 3 days after this study, the obstruction became complete and the patient could not even swallow water.

Thoracolaparotomy on October 9, 1959, disclosed a hard mass at the cardia, about the size of a man's fist. Involved in this mass, as if drawn by the contraction of a cicatrix, were the distal esophagus, the gastric remnant, the body of the pancreas, both loops of the gastrojejunostomy and the transverse mesocolon. Extensive as it was, the lesion appeared to be localized, and there was no evidence of dissemination of the neoplasm. The distal esophagus, gastric remnant, both limbs of the gastrojejunostomy, colon, body and tail of the pancreas and spleen were removed *en bloc* (figs. 3 and 4). The proximal jejunum was anastomosed in a Roux-en-Y to the distal jejunum, end-to-side, and the proximal end of the distal jejunum was anastomosed end-to-end to the esophagus. The transverse colon was anastomosed to the descending colon behind the loop of jejunum (fig. 5) entering the chest, and a Witzel jejunostomy was established for continuous suction and feeding distal to the above anastomosis.

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FIG. 1. Roentgenogram of stomach taken at initial study July 7, 1949, demonstrates an ulcerating lesion along the lesser curvature. This was the site of the malignancy which was resected primarily 3 years later.

FIG. 2. Roentgenogram of lower esophagus and gastric remnant reveals a stenosing lesion in the lower esophagus and gastric cardia. Lumen of the stomach has been markedly reduced in volume by tumor infiltration.

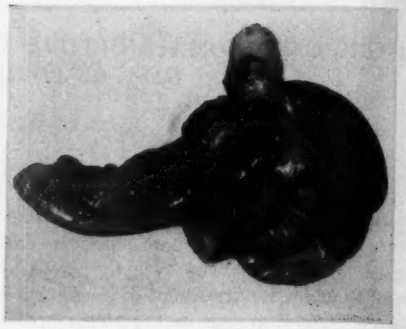

FIG. 3. Photograph of the resected specimen. Reference to figure 4, a diagrammatic sketch, will aid in orienting and identifying the various organs and their relationship to one another.

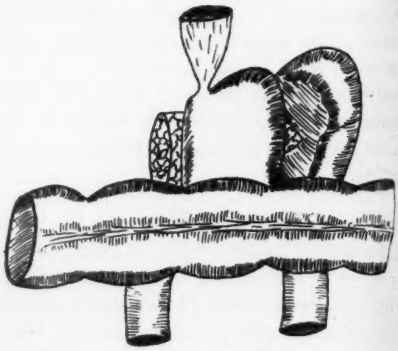

FIG. 4. Diagram of the resected viscera

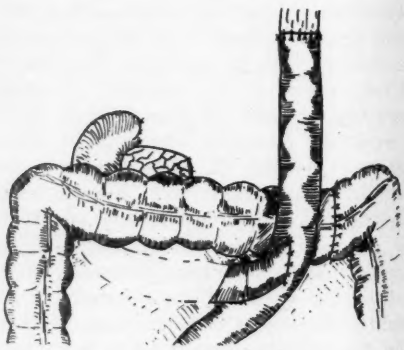

FIG. 5. Details of the reconstructed esophagojejunostomy. Roux-en-Y duodenojejunostomy returns pancreatobiliary secretions to the alimentary stream. Colon anastomosed behind the jejunostomy.

Recovery was uneventful except for partial small bowel obstruction which occurred on the 11th postoperative day and responded to conservative measures. The patient weighed 108 pounds when he left the hospital and 7 weeks later weighed 125 pounds. He has had no symptoms suggesting dumping and is maintaining his weight at the preoperative level without difficulty.

DISCUSSION

Several questions are raised as one reviews the history of this man's illness. Was his original lesion a benign gastric ulcer which subsequently became malignant, or was it a malignant ulcer from its inception? If it was malignant, why did it not disseminate more widely in the 3-year period during which the patient refused surgery and was treated conservatively? Why did it remain localized over a 7-year period after gastrectomy, and cause symptoms only when it became obstructing? Why did it react more like a cicatrix than a neoplasm? And finally, why did it pursue such a benign course when histologically it was so anaplastic?

These questions, of course, cannot be answered in the light of our present knowledge. In generalizing, we can say only that the host's resistance to the lesion was unusually strong, or that the invasive qualities of the tumor were not as great as its microscopic appearance would indicate.

I cannot see that the 3-year period, during which there was an ulcerating lesion of the stomach which appeared to heal with medical management, lends any weight to either side of the argument as to whether or not ulcers become malignant or are malignant from onset.

It does, however, strongly emphasize that any gastric ulcer may *be* or may *become* malignant, in spite of ideal and seemingly successful medical management. Youth of the patient, long duration of the illness, size of the ulcer, apparent tendency to heal and symptomatic or roentgenologic improvement should not be taken as proof, or even indication, of the benign character of a gastric ulcer. We in our department firmly believe, as a result of our experience with this and many other gastric ulcer cases, that all ulcerating lesions of the stomach should be surgically removed.

It may seem to some that such extensive surgery for a lesion that is likely to be incurable is unjustified. We are not of the school of superradical surgery for lesions that are expected to terminate the patient's life in a short period of time—and practically all extensive gastric carcinomas might be so classified. The history in this case, however, led us to believe that even though we might leave some residual neoplasm, if we could relieve the obstruction and re-establish alimentary continuity, the patient may well survive and be well palliated for a number of years.

SUMMARY

A patient with a residual anaplastic carcinoma of the stomach who survived and maintained good general health and nutrition over a period of ten years has been presented. The lesion recurred locally and was resectable seven years later by removing the distal esophagus, gastric remnant, both loops of the gastrojejunostomy, the transverse colon, the tail and body of the pancreas and the spleen. Reconstruction was by esophagojejunostomy, duodenojejunostomy (Roux-en-Y) and reanastomosis of the colon. The patient made a satisfactory recovery and has regained his maximal weight.

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CONVERSION OF GASTROJEJUNOSTOMY TO GASTRODUODENOSTOMY IN TREATING THE DUMPING SYNDROME

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Many recent articles have discussed the relative merits of the Billroth I and Billroth II gastrectomies in the treatment of ulcerating lesions of the stomach and duodenum.

Those advocating the Billroth I (gastroduodenostomy) procedure refer to its use in the treatment of the dumping syndrome in patients who have previously undergone gastric surgery and have a Billroth II anastomosis (gastrojejunostomy). Although the conversion of the latter to the former is frequently mentioned, and indeed recommended, few authors report personal experience with its use for this purpose. Teicher and co-workers[6] reported the first case in American literature in 1951. He performed the conversion for severe stomal malfunction of the gastrojejunostomy, with a good result. Mathewson[4], in 1955, reported two cases with excellent postoperative results, and in that same year Woodward and co-workers[7] reported three cases of severe dumping syndrome, successfully treated by the conversion of gastrojejunostomies to gastroduodenostomies. Hinshaw and co-workers[3] reported an additional five cases in 1957. In his report, objective and clinical evidence of improvement was confirmed by plasma volume studies and electroencephalography during controlled feedings designed to induce dumping. It should be mentioned that Bohmansson[1] and Perman[5], in Scandinavia, have been performing this type of conversion since 1927 and 1929, respectively, and have reported more than 50 cases for which the conversions were performed for dumping, excessive loss of and failure to gain weight because of malfunctioning stomas, as well as chronic diarrheas and other side-effects which are known to complicate the procedure. They reported relief or marked improvement in their patients and had but a single death.

We are among those who have had a favorable experience with the Billroth I procedure as the primary operation in treating benign gastric ulcers, and have previously reported our experiences with a modest series of cases.[2] Although we were not impressed with the difference in the incidence of the dumping syndrome when one or the other operation was utilized, we did feel that the symptoms were not so enduring nor so severe in those individuals who had gastroduodenostomies. Because of the foregoing reasons, when confronted with a patient whose severe and disabling symptoms of dumping defied all other measures, we performed a conversion of a gastrojejunostomy to a gastroduodenostomy, with highly gratifying results. The paucity of reported cases justifies publication of the results of a single such operation.

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CASE REPORT

A 48-year-old woman was admitted to the Irwin Army Hospital with complaints of postprandial syncope, abdominal pain, sweating and weakness as well as a marked weight loss of 1 year's duration. These symptoms began immediately after a gastric resection for a benign gastric ulcer 1 year before this admission. A report from the previous surgeon confirmed the benignancy of the ulcer. Her weight before the initial surgery was 155 pounds, and at this time was 108 pounds. She stated that she had to lie down after every meal for ½ to 2 hr. She had profuse sweating and felt faint and weak after the ingestion of almost any type of food, but her distress was most severe after eating carbohydrates. A consultation with her family physician revealed that she had been on a good regime for the conservative management of dumping without significant improvement. A period of 10 days' treatment in the hospital failed to reduce the severity of her symptoms.

Physical examination revealed a tall, emaciated, depressed woman who appeared several years older than her stated age. Her abdomen was scaphoid and the skin was inelastic and hung in loose folds. There was a well healed upper abdominal incision. No masses were noted on the initial examination, but the patient later called our attention to a large, soft, sausage-shaped mass which appeared in the right side of the abdomen immediately after eating, and which

disappeared as her dumping symptoms improved with resting. She stated that she always had a painful feeling of pressure and cramping associated with the appearance of the mass. There were no other noteworthy physical signs. Barium studies (fig. 1) revealed a very small gastric pouch with a wide stoma of the Pólya type gastrojejunostomy. Both afferent and efferent limbs of the anastomosis filled and no obstruction was present.

A laparotomy was performed on October 25, 1958. The small remaining stomach was anastomosed, as shown in the barium studies, to the proximal jejunum by an antiperistaltic, antecolic Pólya anastomosis. There were few adhesions and we found no structure which might have explained the swelling noted in the right upper quadrant after eating. We assumed that it represented the loop of proximal jejunum suddenly distended by the influx of fluid into the bowel, incident to the dumping complex. The jejunum adjacent to the anastomosis was dilated to about twice its usual diameter.

The gastrojejunostomy was dismantled and the opening in the jejunum was closed without reresection. A gastroduodenostomy was performed with a double row of interrupted sutures; the duodenum was anastomosed to the open end of the stomach nearest the lesser curvature; and the remainder of the stomach was closed with interrupted sutures. A routine closure of the wound was performed. Convalescence was uneventful. A soft diet was tolerated on the 4th postoperative day, and the patient denied any symptoms of the sort she had suffered before surgery. She did complain of pain in her left shoulder when overeating, but this disappeared without treatment other than temporary limitation of the quantity of food eaten at one sitting. She has since gained 21 pounds in weight, eats only 3 meals a day and claims an excellent appetite. She now works full time as a switchboard operator and does her own housekeeping.

DISCUSSION

Although the syndrome of dumping is largely one of altered physiology, there are certain anatomical factors, at least one of which is universally accepted, predisposing to the development of the symptom complex. Regardless of the type of reconstructive anastomosis, the incidence of dumping is found to be directly related to the amount of the stomach that is removed. Stated otherwise, the smaller the gastric pouch remaining, the higher the incidence of dumping and the more severe the disability produced by the symptoms. Every surgeon is aware of the disability resulting from total gastrectomy. Our patient had a very radical gastric resection, performed initially for an

FIG. 1. Roentgenogram of Billroth II gastrojejunostomy, Pólya type, as seen on barium study before surgery.

FIG. 2. Interpretive drawing of roentgenogram Billroth II. Note the small gastric remnant and the wide stoma.

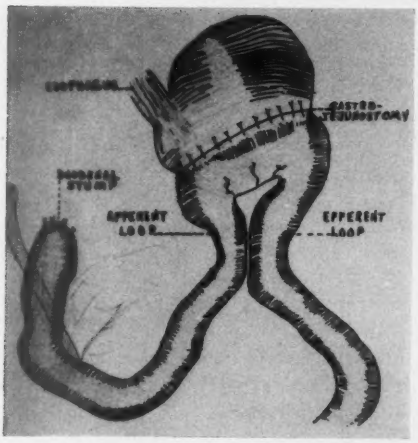

FIG. 3. Sketch of the gastroenterostomy as it was seen at laparotomy. Note that very little of the greater curvature of the stomach remains.

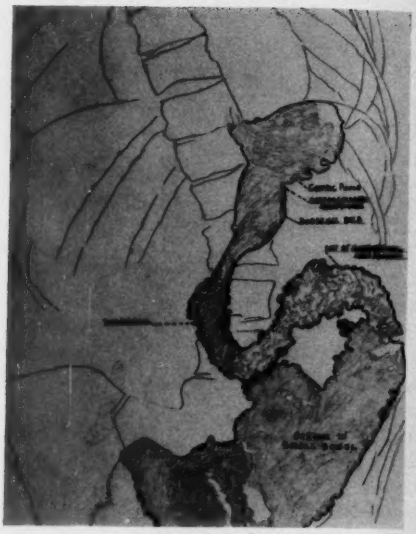

FIG. 5. Interpretive drawing of the gastroduodenostomy.

FIG. 4. Roentgenogram of Billroth I gastroduodenostomy after the conversion.

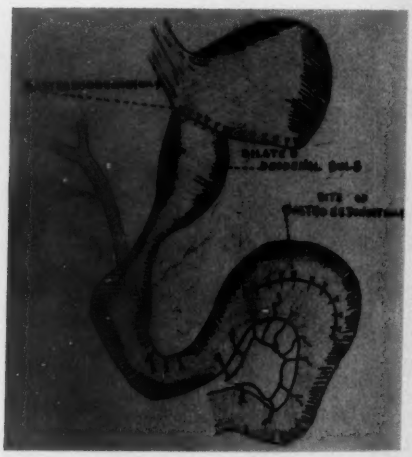

FIG. 6. Sketch of the converted gastroduodenostomy. Note that duodenum is anastomosed to the lesser curvature of the stomach because previous resection of most of greater curvature did not allow approximation without tension of the duodenum to the greater curvature.

ulcer on the lesser curvature of the stomach near the pylorus. Since gastric ulcers are much less prone to recur than are duodenal ulcers, we have tended to be somewhat more conservative in the amount of stomach that is removed in treating benign gastric lesions.

Figures 1 to 6 indicate that as much as 75 or 80 per cent of the stomach was removed in this instance, whereas a 50 per cent resection might have been expected to result in a cure. A less than universally accepted factor, but, nevertheless, one which we and others feel is of major importance in the etiology of dumping, is the size of the anastomotic stoma. The smaller the stoma (within reason, of course), the less likely

the appearance of the symptoms of dumping in the postgastrectomy period. This patient had very little gastric capacity and an unusually wide stoma resulted from the Pólya anastomosis, which utilizes the entire open end of the stomach rather than the 3 or 4 cm. used in the Hofmeister modification of the Pólya procedure. The Hofmeister modification of the Pólya procedure enjoys a greater popularity than the original Pólya. The combination of these two, undoubtedly, was responsible for the severity and intractability of the patient's symptoms.

In viewing this latter consideration, one might surmise that a reduction in the size of our patient's stoma was possibly the factor responsible for the symptomatic and nutritional improvement in the postoperative period, and that the conversion of the gastrojejunostomy to gastroduodenostomy was not, in itself, responsible for the benefits which were noted. We cannot unequivocally deny this. However, in at least one of the cases reported by Mathewson, the patient was made worse by a second Billroth II revision, but was relieved of his symptoms at a third operation by conversion to a Billroth I. Also, there are numerous experimental and clinical reports in the literature attesting to the fact that iron and nitrogen metabolism is superior in the Billroth I type anastomosis.

Because much of the greater curvature had been previously removed, it was not feasible to anastomose the duodenum to the greater curvature of the stomach, as is our usual custom in performing gastroduodenostomies. It was necessary to close that part of the open end of the stomach adjacent to the greater curvature and utilize the lesser curvature for our anastomosis (fig. 6). Fortunately, this was easily accomplished after mobilizing the second portion of the duodenum by the Kocher technique. It will be noted in figures 4 to 6 that the site of the gastroduodenostomy actually lies in the left upper quadrant of the abdomen near the esophageal hiatus. This should be noted by those who contend that the Billroth I should not be used because adequate gastrectomy cannot be performed if the stomach is to be anastomosed to the duodenum.

Follow-up barium studies demonstrated a pronounced dilation of the duodenal bulb which conceivably is acting as a supplementary reservoir to the stomach pouch.

SUMMARY

Since our experience was obtained with a single case in which the Billroth II was converted to a Billroth I, we feel it would be presumptuous of us to advocate unequivocally the use of this procedure in treating the dumping syndrome. A case report is presented to demonstrate the effectiveness of this procedure.

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LIPOTHYMOMA WITH CYSTIC LYMPHANGIOMA: CASE REPORT

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Routine preoperative and mass survey chest x-rays have brought to light many interesting and unusual pulmonary and mediastinal lesions. Among the more infrequent of these lesions is the lipothymoma. To date, 12 of these lesions have been reported in the English literature.[1-5] The essential features of the tumor are the presence of normal adipose tissue with accumulations of lymphocytes and the characteristic Hassall's corpuscles of thymic tissue. In addition to these features, the histologic finding of lymphangiomatous cystic spaces was noted in this case. This phenomenon has not been previously recorded.

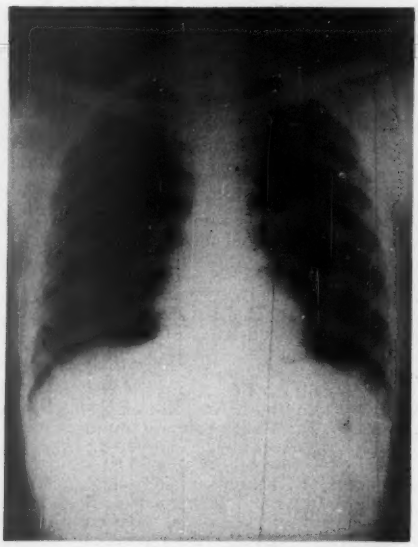

FIG. 1. Preoperative chest x-ray showing broadening of the upper mediastinal shadow and displacement of the trachea to the right.

CASE REPORT

A 29-year-old Japanese male accountant had been observed by several physicians, over a period of approximately 10 years, for episodes of paroxysmal auricular tachycardia. Originally the episodes were very infrequent and were easily controlled by use of either carotid or eyeball pressure. During the year before examination, the episodes had become more frequent and on one occasion had required the use of quinidine and digitalis for control.

FIG. 2. Left lateral chest x-ray showing the anterior superior mediastinal mass.

Examination showed a young Japanese man in no acute distress. Blood pressure on admission to the hospital was 114/80, pulse 80, respirations 20 and temperature 98.6° F. The only significant physical findings were slight deviation of the trachea to the right in the suprasternal notch and a broadening of dullness to percussion of the upper mediastinal area. An electrocardiogram showed regular rhythm with no abnormalities.

X-rays on this patient were available over a period of approximately 5 years. The first x-ray, in 1954, disclosed an irregular shadow along the left border of the mediastinum, which partially obscured the aortic knob (figs. 1 and 2). It extended from the clavicle to the hilar area. Subsequent x-rays also showed deviation of the trachea to the right. Laminagrams disclosed a large

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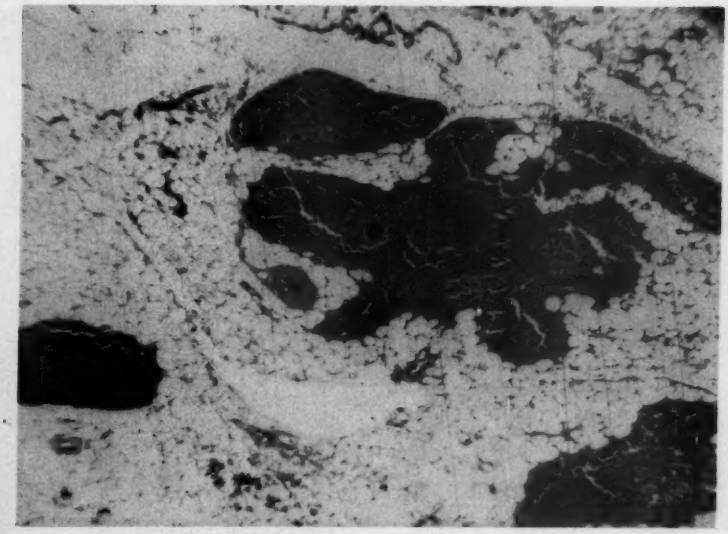

FIG. 3. Low power view to show sharply outlined streaks and accumulations of thymic tissue embedded within adipose tissue. Hematoxylin and eosin, ×45.

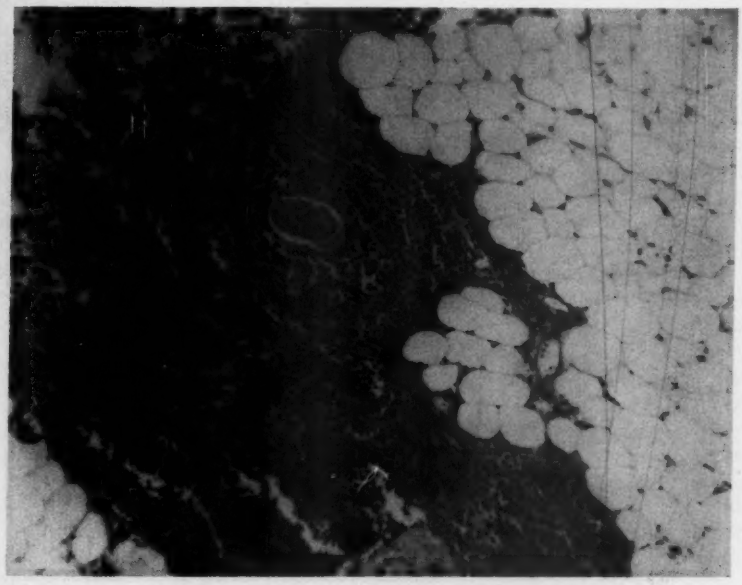

FIG. 4. Higher magnification showing thymic tissue made up of lymphocytes and Hassall's corpuscles surrounded by normal appearing fat cells. Hematoxylin and eosin, ×120.

homogeneous lesion extending from T-2 to T-6, causing broadening of the upper mediastinal shadow, principally to the left. There was deviation of the trachea to the right and posteriorly. Fluoroscopy showed no transmission of pulsation. Angiocardiogram revealed no involvement of the aorta or the great vessels of the arch.

In view of the possible association of this

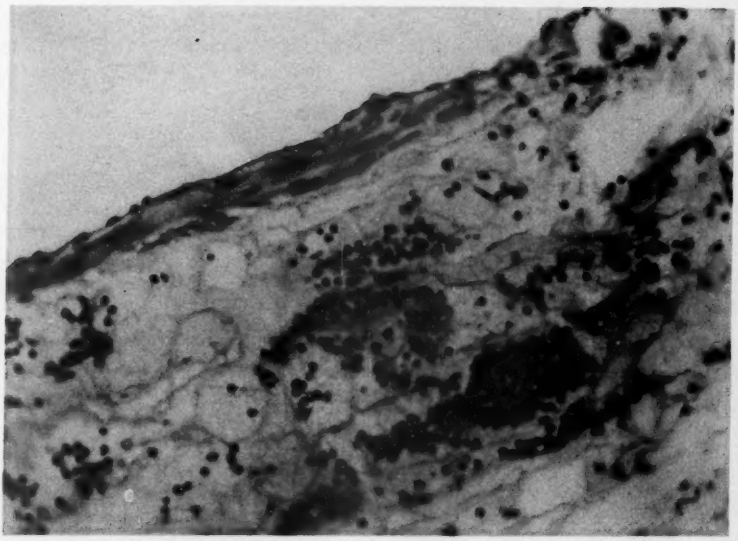

FIG. 5. Wall of lymphogenous cyst. It is lined by endothelium and is made up of a thin inner zone of smooth muscle, and a thicker outer zone of connective tissue containing lymphocytes. Hematoxylin and eosin, ×265.

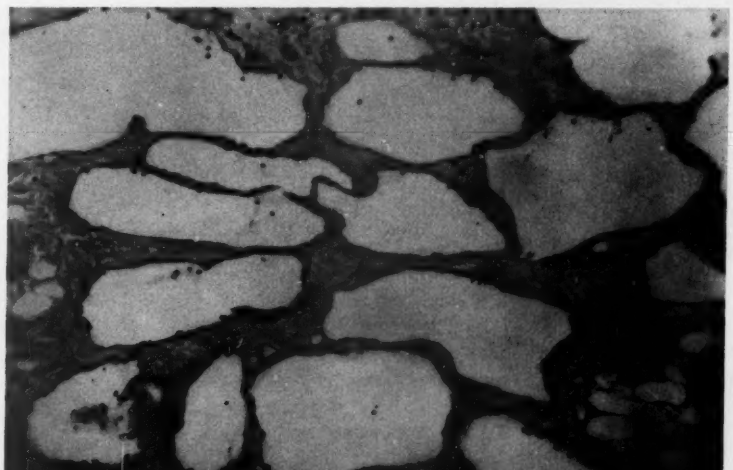

FIG. 6. Typical appearance of lymphangioma found in some parts of the tumor. Hematoxylin and eosin, ×120.

patient's symptoms with pressure from an expanding lesion in the upper mediastinum, thoracotomy was advised and carried out on April 14, 1959. A left posterolateral incision was made through the bed of the fifth rib. The lung was found to be normal as were the heart and great vessels. Overlying the left lateral surface of the mediastinum and extending from the thoracic

FIG. 7. Chest x-ray four months postoperatively showing persistent elevation of the left diaphragm and residual pleural reaction.

inlet to the hilum was a yellowish white tumor mass. Both the vagus and phrenic nerves were noted to pass through the lesion. There was no definite capsule. Frozen sections from two representative areas were reported to be a lipoma and a thymoma, respectively.

Removal of the mass was then carried out. Dissection was started in the hilar area where the vagus and phrenic nerves could be identified. These were first dissected free and then the tumor removed without difficulty. The edges of the lesion were not sharply defined and blended into surrounding areolar tissue. After removal of the lesion, the mediastinal pleura was loosely approximated and the chest closed and two thoracotomy tubes left in place.

Gross examination of the specimen showed an irregular mass of tissue weighing 63 gm. The gross appearance was that of fat containing innumerable small pink nodules 1 mm. or so in diameter. In addition, two cystic areas were evident, the largest of these measuring 2 by 1.5 cm. in diameter.

Microscopically, the tumor was made up of normal appearing fat, containing many small clumps and strands of lymphoid tissue, and in many of the lymphoid foci, Hassall's corpuscles were evident (figs. 3 to 5). The cysts mentioned in the gross description were of angiomatous nature, being lined by a single layer of endothelium. The walls were made up of a very thin layer of smooth muscle, just beneath the endothelium, with a loose areolar tissue peripheral to this. This areolar tissue contained foci of lymphocytes. The cysts were thought to be of lymphangiomatous nature because of the histologic appearance of the wall and because some parts of the tumor showed typical features of lymphangioma (fig. 6). The diagnosis of lipothymoma was justified by the fact that the bulk of the tumor consisted of adipose and thymic tissue.

Postoperative course was uneventful except for a temporary paralysis of the left recurrent and the phrenic nerve on the left. Function of the left vocal cord had returned within a period of 3 months. Most recent chest x-rays still show elevation of the diaphragm (fig. 7). In the immediate postoperative period, there was no recurrence of the paroxysmal auricular tachycardia. However, when the patient resumed his normal activities and returned to work, he did experience an episode which was easily controlled by eyeball pressure.

DISCUSSION

There have been several concepts propounded as to the etiology of these lesions. There is a striking resemblance between the normally degenerating thymus and lipothymoma. However, it is difficult to reconcile the relative increase in the tissue elements with a degenerative process. Perhaps the most tenable concept is that proposed by Hall in 1949,[6] when he first proposed the term lipothymoma. It was his conception that the lesion represented a true tumor of both the lipoid and the thymic elements. The lesions so far reported in this series have presented the gross appearance of lipoid tissue with irregular fine grayish nodular areas studded throughout the cut surface. It is easy to see that sections taken from a predominantly fatty area might give the erroneous concept that one were dealing entirely with a lipoma. For this reason, it is possible that some of these lesions have been overlooked in the past and reported as pure mediastinal lipomas, whereas multiple sections might have revealed their true identity as lipothymomas.[7-9]

No cases of myasthenia gravis or malignancy have been reported in association with a lipothymoma. Only a few of the cases in the series have had any symptoms, and these for the most part can be attributed to displacement of mediastinal structures from the pressure of the

expanding lesion. In the case presented, it was supposed preoperatively that the paroxysmal auricular tachycardia might in some way be associated with the mediastinal lesion. The recurrence of tachycardia subsequent to surgery has fairly well ruled this out.

SUMMARY

A case of lipothymoma with associated cystic lymphangiomatous formation has been presented. No significance is attached to this association; it is presented merely as an interesting histologic picture. This is the 13th case of lipothymoma presented in the English literature and the first in which lymphangiomatous cyst has been noted.

It is possible that in the past many of these lesions may have been overlooked and reported as mediastinal lipomas, rather than lipothymomas, because of failure to take multiple microscopic sections through representative areas.

The most tenable concept as to the etiology of these lesions is that they represent a true tumor of both the lipoid and thymic elements.

Myasthenia gravis or malignancy have never been reported in association with a lipothymoma. The only symptoms reported to date are those due to pressure on the adjacent mediastinal structures.

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DIVERTICULITIS OF THE CECUM: PREOPERATIVE DIAGNOSIS

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Acute diverticulitis of the cecum, once thought to be a rarity, has been reported with increasing frequency in recent years and has now assumed prominence among conditions to be considered in the acute abdomen. Recent lengthy and pertinent reviews of the literature by Nissenbaum and co-workers[2] and Schapira and co-workers[3] amply attest its significance and detail the salient clinical and pathologic features. However, most authors have underemphasized specific clues leading to a correct preoperative diagnosis.

Burgess[1], in 1940, and Waite[4], in 1954, stimulated our interest in this condition by tabulating and reporting all cases of diverticulitis of the cecum operated upon by surgeons in our group. Awareness always promotes vigilance and accounts for our increasing local frequency of cases seen. Their work and our subsequent experience lead us to conclude that the lesion produces recognizable signs and symptoms which will lead to proper diagnostic procedures and correct treatment. Our conclusions are based on 30 cases of cecal diverticulitis, proved and treated by operation, and an unknown number of recent cases diagnosed clinically and confirmed radiographically. Operation is required less often when a correct diagnosis of cecal diverticulitis can be made and medical therapy promptly instituted.

TWO DISTINCT PHASES

The course of diverticulitis of the cecum may be divided into two phases, which should be considered separately since the differential diagnosis and proper treatment may differ widely.

The acute phase may closely simulate appendicitis. The physical findings may be identical, and only by detailed history can one uncover features of the illness which may lead to a correct diagnosis of diverticulitis. In general, we have noted that the onset of diverticulitis is more insidious than that of appendicitis, and the duration of symptoms, before the patient consults a physician, is somewhat longer (average 48 hr. *versus* 6 to 8 hr. in acute appendicitis). Pain usually starts and remains in the region of the inflamed diverticulum, whereas in appendicitis it starts in the periumbilical or epigastric areas or as generalized abdominal pain, shifting into the right lower quadrant only as the disease process advances. Anorexia, nausea and vomiting, prominent features of acute appendicitis, are minimal or absent, and, indeed, the patient frequently maintains an excellent appetite with an acute cecal diverticulitis. In general, although not reliably so, leukocytosis is less marked in diverticulitis. Temperature elevation may or may not be present in either entity.

In patients with suspected cecal diverticulitis, barium enema examination may indicate acute appendicitis and influence the surgeon to operate immediately. Nonfilling of the vermiform appendix, edema of the tip of the cecum, and spot tenderness to palpation at fluoroscopy were diagnostic of acute appendicitis in such a patient with these findings (fig. 1). On the other hand, the roentgen diagnosis of acute diverticulitis of the cecum guided the surgeon to adopt conservative medical therapy, with close observation of a patient who had similar clinical signs and symptoms (fig. 2). By no means do we advocate a barium enema in persons with classical appendicitis.

In the second or granulomatous phase of cecal diverticulitis, the differential will include periappendiceal abscess (or granuloma) and carcinoma of the cecum. The duration of symptoms may range from 10 or 12 days to several months. The common feature will be discomfort in the right lower quadrant associated with a palpable mass, which the patient may have discovered during self-examination. Roentgen examination may reveal a bulky granulomatous mass, distorting the cecum with or without the demonstration of a causative inflamed diverticulum (fig. 3).

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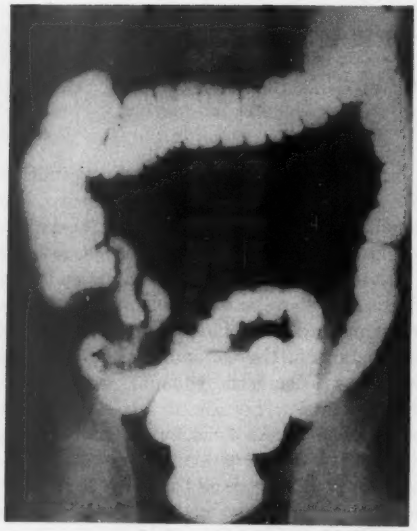

FIG. 1. Acute appendicitis produces nonfilling of appendix, spot tenderness and edema of cecal tip. Appendectomy done.

FIG. 2. "Skyrocket burst" sign of cecal diverticulitis. Appendix filled. Conservative medical therapy in this instance.

The therapy of the two phases also should be considered separately. In the acute phase, the distinction from acute appendicitis may be so difficult that laparotomy is mandated. When a diagnosis of appendicitis is a strong possibility, laparotomy is probably the wisest course. We believe, however, that a few hours of observation—when diverticulitis is the more probable diagnosis—do not add to the risk, and we further believe that it is undesirable to operate upon diverticulitis in the acute phase. Although diverticulectomy can occasionally be performed (and, when feasible, is the ideal treatment), not infrequently the surgeon is forced to decide between closure of the wound, with or without drainage from the site of the inflammatory lesion, and resection of the right colon. When the bowel is not mechanically cleansed or bacteriologically prepared, colectomy is relatively hazardous.

FIG. 3. Granulomatous phase in diverticulitis of the cecum with mass lesion simulating malignancy. Treatment by right hemicolectomy.

If the diagnosis of acute diverticulitis is made with reasonable assurance, conservative treatment may allow the process to resolve itself completely, or definitive therapy may be carried out at an elective time under optimal conditions, with ideal preparation and the promise of lessened morbidity.

In the granulomatous phase, resection of the right colon will usually be required, although if neoplastic involvement can be discounted with reasonable assurance by roentgen study, a period of conservative management is not contraindicated.

ROENTGEN DIAGNOSTIC FEATURES

The awareness of surgeons in our group that diverticulitis of the cecum may be diagnosed preoperatively has led to more frequent use of barium enema studies in patients with right lower abdominal quadrant pain which suggests appendiceal colic. In 10 of the last 21 patients operated upon for diverticulitis of the cecum, a preoperative barium enema forewarned the surgeon that a disease of greater consequence than simple acute appendicitis was present. Roentgenographically, the diagnosis of diverticulitis was made in the majority of cases; less often, the findings of nonspecific cecal inflammation were demonstrated. In one instance, the constant cecal deformity could not be distinguished from a malignant neoplasm.

Acute inflammation of diverticula will produce cecal irritability, spasm and lack of distensibility, and, when multiple diverticula are present, the "skyrocket burst" sign. Later, in the developing granulomatous phase, fixation of the cecum and localized persistent filling defects become evident. These mass lesions may mimic adenocarcinoma of the cecum. When diverticula are actually seen, with associated inflammatory signs, and barium enters the vermiform appendix, the diagnosis can be made with relative certainty (fig. 4).

Although no complications of barium enema study, such as perforation, were encountered, we recognize the minimum risk possibilities which also exist when dealing with diverticulitis of the sigmoid. Oral catharsis has occasionally been cautiously used, but we regard gentle cleansing enemas as safer in acute cases. Residual barium in the colon has not hindered the surgeon or produced untoward reaction.

It is of interest and perhaps significant that of all 10 cases of diverticulitis of the cecum in which a barium enema examination was done, no patient had any diverticula distal to the hepatic flexure. In view of the relative infrequency of diverticulosis of the cecum, it would seem that patients with diverticula confined to the right colon have a propensity to develop diverticulitis.

ANALYSIS OF RESULTS

Since 1929 our group has seen 30 adults in whom surgery was performed for acute or granulomatous diverticulitis of the cecum.

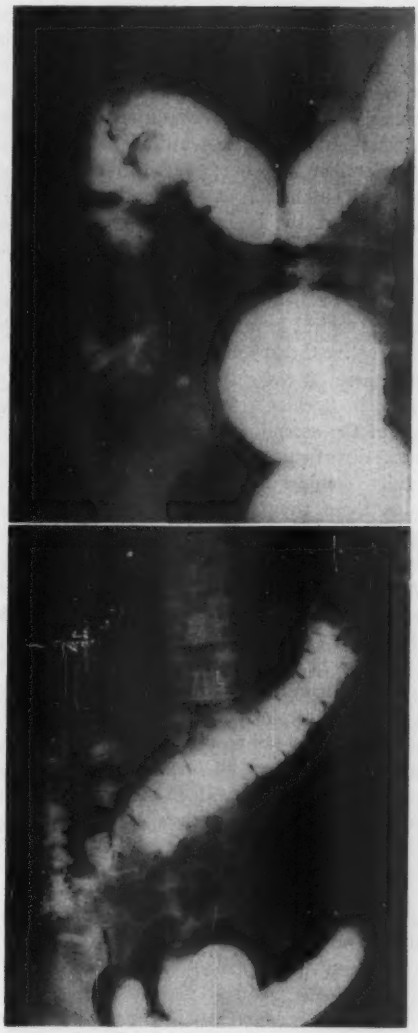

FIG. 4. Typical radiographic appearance of cecal diverticulitis. Both cases treated by right hemicolectomy.

There were 22 men and 8 women; the eldest was 75, the youngest 17, and the average age 40. Therefore, we believe that diverticulitis in the cecum occurs in a younger age group than diverticulitis of the sigmoid, which further complicates its differentiation from appendicitis. In 1940 5 of these were reported by Burgess; 12 additional cases were reported by Waite in 1954; and we are adding an additional 13 cases

seen since that time. In 1 of the 5 cases reported before 1940, the diagnosis was suspected preoperatively, and in this instance, the appendix had been removed previously. As a result of the emphasis placed on the condition by the two previous studies, these entities have become more familiar and our awareness more acute, and 5 of our last 7 cases have been correctly diagnosed on the basis of roentgen or clinical findings before surgery. In addition to these, as already mentioned, several cases are not included here because these patients did not require surgical intervention and recovered with conservative therapy alone.

Of these 30 cases 19 were seen in the acute phase; in 3 cases resection of the cecum and part of the ascending colon was required. In 8 cases, diverticulectomy was possible and was usually combined with appendectomy. In 2 cases, there were perforation and abscess formation with localized peritonitis and in these, drainage only was carried out. In the remaining 6 cases, diverticulectomy was deemed inadvisable and appendectomy, with or without drainage, was performed.

We saw 11 cases in the granulomatous phase and all of these required resection of the diseased bowel and ileocolostomy. There were no deaths in this series. In the postoperative period 3 of the patients developed intestinal obstruction and were reoperated upon. Ileotransverse colostomy was performed in each of these and all recovered. Of these 11 patients, 2 had prolonged drainage but recovered without further surgical intervention.

SUMMARY

From our experience with 30 operated cases and other conservatively treated cases, we conclude that diverticulitis of the cecum produces clinical signs and symptoms and roentgen findings which may differentiate the disease from appendiceal colic and other acute abdominal conditions.

The alert surgeon can usually diagnose diverticulitis of the cecum in a patient before laparotomy if he is aware of the entity and characteristics of the disease and consults the radiologist for a barium enema examination.

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THE PREOPERATIVE MEDICAL EXAMINATION

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Early in my medical career, as a first-year intern, I learned the value of careful preoperative preparation before giving a general anesthetic. It was late in the afternoon in the operating rooms of a busy, large general hospital when a physician's daughter, a husky girl in her early teens, was brought directly to the operating room from the family car for incision and drainage of a large carbuncle of the buttock.

No preoperative examination was done and no preoperative medications were given. Intravenous Pentothal was administered. The girl was extremely frightened before this and promptly went into severe laryngeal spasm. Severe cyanosis ensued. Prompt laryngoscopy and mechanical separation of the vocal cords relieved the situation, but there were several minutes of great concern.

In retrospect, this procedure was really not an emergency, and proper preoperative preparation might have averted the near catastrophe. It is our policy to have all patients who are to be admitted to a hospital for surgery referred to the Medical Department for preoperative evaluation. The magnitude of the operation planned is of some importance, but it must always be remembered that any anesthetic may be hazardous especially if certain conditions are unrecognized before surgery.

Routine procedures, such as a survey chest film, urinalysis, complete blood count and prothrombin time, are done. We are inclined to agree with Diamond and Porter[2] that bleeding and clotting times are of little value in the preoperative workup. A careful history of past illnesses with particular reference to the cardiovascular, pulmonary and central nervous systems is taken. Attention must be paid to the history of drug sensitivities, lest some medication given during or immediately after an operation result in a severe reaction. Recent drug therapy, especially with the use of steroids or chlorothiazide, must not go unrecognized. The possibility that steroid therapy must be supplemented during and after the operation, or that there may be hypopotassemia, should be borne in mind.

Careful history regarding the possible previous occurrence of rheumatic fever, glomerulonephritis or periodic bronchial asthma should be sought; a previous history of gout should be looked for in older persons. Persons with an elevated blood uric acid may blossom out with acute gout a day or so after major surgery, especially if there is any element of dehydration. In men over 30 and women over 40, careful questioning regarding latent angina pectoris should be made and any symptoms suggestive of early congestive heart failure noted. The finding of uncontrolled diabetes, unless there is a dire surgical emergency, calls for several days' hospitalization to regulate this metabolic defect.

In elderly men, questions should be directed toward discovering chronic prostatic hypertrophy. If the answers are suspicious and the urinary findings are abnormal, blood chemistry studies and urologic consultation are indicated unless a surgical emergency exists. A pelvic examination in women should be routine.

PHYSICAL EXAMINATION

Appraisal of the patient's physical status during the taking of the history is important. The degree of any anxiety, the presence of obesity, or evidence of chronic illness may be apparent during the history taking.

A careful examination should be made of the cardiovascular system, with blood pressure recordings in both arms if one side is abnormal; auscultation of the heart in both the lying and sitting positions should be done; and in persons past the age of 40, an accentuation of the pulmonary second sound should always be looked for. An accentuated pulmonary second sound, after 40, would indicate pulmonary hypertension and further study for its cause, whether it is caused by early left ventricular failure or other factors. Preoperative electrocardiograms are not

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routine but should be done in men over 30, and in women past the menopause in order to have a baseline if any arrhythmias occur during or after operation. Frequently, fluoroscopic examination of the heart shadow in addition to the routine chest film may be helpful. Also, a look at the eye grounds may be helpful.

Rectal examination should be included to further evaluate the prostatic status.

Palpation of the foot vessels, when one suspects atherosclerosis, should be routine.

In all patients, but especially in poor-risk ones, the preoperative advice of a well trained anesthesiologist is invaluable. During the course of a surgical operation, the team of anesthetist, surgeon and medical consultant is at times life saving. Many elderly patients with advanced heart disease can tolerate major surgical procedures extremely well. Bundle-branch block may be especially well borne. Cardiac enlargement always brings with it the danger of congestive heart failure if excessive intravenous fluids, especially saline, are used either during or after operation. The presence of angina pectoris, atrial fibrillation, aortic stenosis or mitral stenosis should be noted. In the presence of angina, aortic stenosis or Adams-Stokes syndrome, the family should be warned that sudden death may occur.

The internist should evaluate pulmonary function in the presence of bronchiectasis, pulmonary fibrosis, emphysema or chronic bronchial asthma. Many of the complicated measurements of pulmonary function are nice to have, but without meaning to be flippant, one can walk the patient up three flights of stairs and make a fairly accurate determination of what his pulmonary reserve may be.

Vascular disorders of the central nervous system also require consideration. A small cerebral thrombosis, in the past, or the basilar artery syndrome, always increases the risk, and the family should be warned that there is some chance of a postoperative complication resulting from this situation.

Finally, the presence of anemia and its degree, if present, should be corrected, as well as a possible loss in blood volume. The cause of the anemia should be ascertained with particular attention to possible blood dyscrasias. There is an excellent discussion of these factors by Denson and Shapiro in *Medical Clinics of North America*.[1] Aside from the prothrombin time, further evidence of latent hepatic insufficiency and a history of jaundice should be sought; a search for spider angiomata and testicular atrophy should be made; and careful palpation of the liver should be carried out.

SUMMARY

A careful history, physical examination and teamwork among anesthetist, surgeon and medical consultant would seem to afford the patient the least risk for any surgical procedure.

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GLAUCOMA AS A GENERAL SURGICAL COMPLICATION

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Glaucoma is a disease of the eye in which the intraocular tension is so high that it causes destructive pressure on the retinal nerve elements. If unabated, this increased tension results in typical clinical findings and eventually partial or complete blindness.

Although we have tonometric values expressed in millimeters of mercury, which theoretically denote the normal intraocular pressure, it is not possible to deny the existence of glaucoma in some persons, even when these values are normal. Conversely, it cannot be dogmatically stated that all patients with pressure values above the arbitrary normal have glaucoma.

The varying scleral resistance and the differing ability of different patients' retinal structures to withstand pressures outside the normal range make it imperative that we rely on other clinical findings to justify this diagnosis. These, in particular, include perimetry and the effect of tonometric pressure on the rate of outflow of the aqueous. These special examinations are routinely done by qualified ophthalmologists.

Eliminating controversial points, we assume that the aqueous fluid is produced by the epithelium of the ciliary body by a combination secretory and diffusion process. It then circulates in the posterior chamber, that small space behind the iris and before the lens, and then passes through the pupil. It circulates in the anterior chamber and finally leaves the anterior chamber through the angle at the extreme periphery of the cornea, at its junction with the root of the iris. It collects in Schlemm's canal and from there goes into the anterior ciliary veins to the superior ophthalmic vein, cavernous sinus and, finally, into the general circulation.

Since the angle through which the aqueous leaves the anterior chamber is the main avenue of exit—again disregarding controversial points, such as the role played by the aqueous veins—we must become aware of changes in this angle by means of a gonioscope. Gonioscopy is the examination of this angle by means of a special lens placed over the cornea, by which we can visualize the angle and decide whether it is open or closed. An open (or wide) angle appears macroscopically to offer no resistance to aqueous outflow. A closed (or narrow) angle shows a diminution in the available space, reducing the potential outflow.

Briefly, some of the causes of a closed angle include its partial obliteration by synechiae from the root of the iris, actual pressure of the iris root into the angle as a result of a swollen lens, obliteration as a result of blood elements packed in its base, and so forth.

Clinically, the open angle glaucoma cases have an insidious course with slow progression in signs and symptoms and with no dramatic acute flare-ups. The narrow angle glaucomas, however, are prone to have acute flare-ups, with marked increase in the pathologic findings. These are the cases which occasionally complicate any surgical procedure in which an element of stress is introduced.

One must not conclude, however, that the aqueous outflow is entirely dependent upon the patency of the angle tissues. Otherwise, there would be no glaucoma in an open angle and always glaucoma in a narrow angle. The outflow is probably determined by changes in the pressure in the efferent veins in relation to the pressure in the efferent vessels carrying the aqueous from the canal of Schlemm. In the phase of rising tension, there is a venous capillary constriction; in the phase of falling tension, an associated venous capillary dilation. It has been suggested that these changes are mediated by the sympathetic nervous system. It is with these two factors, that is, the narrow angle and the mediation of capillary constriction of efferent vessels controlled by the sympathetic nervous system, to which we must look for the cause complicating surgical procedures.

A short consideration of the differential diagnosis between glaucoma and some of the other entities with which it might be confused is in order.

Condensing table 1: a red eye without dis-

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TABLE 1

Eye Division	Iritis	Conjunctivitis	Glaucoma
Iris	Discolored, swollen	No change	Discolored, pulled forward
Pupil	Small, irregular	Normal	Dilated, fixed
Anterior chamber	Normal	Normal	Shallow
Cornea	Transparent	Normal	Cloudy and insensitive
Vision	Dimness	Normal	Marked dimness
Conjunctiva	Transparent	Red and opaque	Chemotic
Ciliary injection	Present	None	Present and episcleral; injected also
Conjunctival discharge	Absent	Mild or profuse	None
Tension	Usually normal	Normal	Elevated

charge, and with a large fixed pupil and elevated pressure to finger palpation, probably is a glaucomatous one. Included in the differential diagnosis should be corneal lacerations and either burns of the cornea, or foreign bodies in the cornea. These are easily demonstrated by seeing the foreign body or by staining the abrasion or burn with 1 per cent fluorescein, which will then show the abrasion as a greenish stain. These complications should always be considered after general surgical procedures.

The treatment of glaucoma is either medical or surgical. The medical treatment consists of an attempt to lower the tension by means of miotics and by the use of Daranide or similar carbonic anhydrase inhibitors. The surgical treatment consists of an attempt to open a new channel for the continued outflow of the aqueous fluid when the normal channels are occluded. In acute, narrow angle glaucoma, surgery is indicated if within 48 hr. the tension cannot be brought down to normal; and surgery is always indicated in both eyes, if it is assumed that they both have narrow angles, because it has been shown that there is about a safe 5-year span in such cases before the second eye becomes involved. Preventive surgery, when the eye is quiet and has no complications, is a much better surgical approach than one which waits until there has been an attack of the glaucoma.

A brief case report will demonstrate the above premise.

CASE REPORT

Mr. K. E., a Caucasian man, was operated upon by Dr. J. E. Strode for the repair of a sliding type esophageal hernia by the Allison method using intratracheal anesthesia, on September 6, 1957, at The Queen's Hospital. Previous to this surgery, the patient had been seen in the Eye Department of the Straub Clinic in 1954, at which time it was noticed that his corneal diameters were smaller than normal, but examination showed his intraocular tension to be within normal limits. (It is good practice to take intraocular tension evaluations on all adult patients before instilling a mydriatic for refractions.)

The patient was seen by me 5 days after surgery because he had been complaining of rather severe pain in the left eye, of 4-hr. duration, without any evidence of discharge from the eye and no gross evidence of a foreign body or corneal laceration. Findings were compatible with an acute glaucomatous attack. The intraocular tension in the right eye was 25 and in the left eye 100 (the normal being between 20 and 25). He was immediately placed on miotics and Diamox, one of the carbonic anhydrase inhibitors. His tension returned to normal within 24 hr.

The continued medical treatment versus the possible surgery was discussed with the patient, but because of his recent major surgical procedure, he decided to try the medical treatment and postpone surgery as long as possible.

On October 7, 1957, while under a less rigid medical treatment regimen, his tension rose to 57 in the left eye, and again intensive medical treatment was instituted. He said at this time that he was worried about an impending second abdominal operation. It was no longer prudent to delay surgical treatment in this case, and on October 11, 1957, bilateral abexternal basal iridectomies were done.

The patient made an uneventful recovery and all sutures were removed on October 22, 1957. He has been free from the clinical signs and symptoms of glaucoma since that time. His vision has remained normal, and when last seen on May 4, 1959, he had no complaints at all.

Incidentally, this patient has had two subsequent major abdominal operations since his glaucoma operation without evidence of a glaucoma complicating the procedures.

SUMMARY

Glaucoma is not an infrequent complication in a general surgical practice. Emotional impact results in a general vasoconstriction, which locally sets off a series of events in a patient who, because of a narrow angle, is a potential glaucomatous individual. Immediate medical treatment is mandatory in all cases, and if this is not successful, it should be followed within 48 hr. by surgical intervention. Subsequent surgery on patients with narrow angles who have had repeated attacks, even though they have been relieved by medical treatment, is good preventive therapy.

A case has been presented which was diagnosed within 4 hr. of its onset, medically treated and later surgically handled with a successful surgical outcome because of the close cooperation among the various departments in this group. The patient subsequently weathered two major operations without a recurrence of glaucoma and when last seen had normal vision and a normal intraocular tension.

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ACUTE GLAUCOMA: DELAYED DIAGNOSIS

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It is well known that acute glaucoma often may be associated with systemic symptoms of prostrating severity. In general, the ocular symptomatology is so prominent that the eyes are not overlooked as the source of illness. At times, however, the ocular symptoms are so overshadowed by the patient's overwhelming illness that he or the attending physician, or both, fail to appreciate their significance.

Acute glaucoma is frequently associated with bradycardia, nausea, vomiting, chills, low grade fever, leukocytosis and even a semi-shocklike state. These reactions seem to be initiated by a trigeminal-vagal reflex.

Because of the above reactions, patients with glaucoma have been diagnosed, initially, as having acute abdomens, coronary occlusions, cerebrovascular accidents and other disorders. This has led to delay in treatment of the primary pathology and thus to increased difficulty in controlling the glaucoma. This, in turn, can result in unnecessary permanent visual loss.

Patients with diabetes are very difficult to control during a glaucoma attack. Of course, this can be attributed to fluid loss and electrolyte imbalance when vomiting or anorexia are associated factors. However, several patients I have seen with a moderately increased tension, *e.g.*, in the 50's, who did not have vomiting, remained out of control until the tension was normalized and then promptly returned to good control.

The following few cases serve as examples demonstrating how the diagnosis of glaucoma was delayed because of the systemic symptomatology. Fortunately, these cases had happy outcomes.

CASE REPORTS

A white woman, 61 years of age, who complained of pain in the right side of her head, diminished vision in the right eye and some nausea, was seen at 3 o'clock in the morning by her surgeon. Her blood pressure was 220/90. There was no definite abdominal distress. Impression was a probable cerebral hemorrhage, although the possibility of a metastatic carcinoma was also considered in view of the fact that the patient had had a radical mastectomy 16 years previously. Morphine sulfate was administered and the patient was to be re-evaluated by her internist in the morning.

The internist, at his examination, noted a fixed dilated pupil on the right, nausea, vomiting and a right-sided headache. The patient was admitted to The Queen's Hospital and a neurosurgical consultation was requested. The neurosurgeon diagnosed acute glaucoma which was confirmed by the ophthalmologist. A basilar iridectomy was performed the day after, 36 hr. after onset. Subsequently, the blood pressure resumed a more nearly normal level and the patient has done well since. Peripheral iridectomy has been performed on the other eye, and both eyes retain normal intraocular pressure although there is a definite permanent visual deficit in the right eye.

A 59-year-old woman was referred to a neurosurgeon because of headache, nausea and vomiting of 1 day's duration. The neurosurgeon noted steamy corneas in both eyes, firm globes, and vision reduced to hand motions. The patient was referred to the ophthalmologist and a diagnosis of acute narrow angle glaucoma in both eyes was made. The patient was hospitalized and tension was controlled with miotics and carbonic anhydrase inhibitors. She refuses surgery, however, and repeat attacks are anticipated.

A 63-year-old woman was referred to the Straub Clinic for consultation and treatment from an outlying island. She had had diabetes and a traumatic cataract of the left eye since 1940. She had been hospitalized for two weeks before referral because of headache, nausea, vomiting, poor control of her diabetes and hypertension. Initial examination revealed a rather severely ill woman, whose blood pressure was 170/100. Further general physical examination was essentially normal with the exception of obesity. Her urinalysis revealed 4+ sugar, albumin and red cells. The internist noted that the left eye was firm and the cornea steamy and referred her to the ophthalmologist. Diagnosis of glaucoma secondary to hypermature cataract was made. The patient was admitted to The Queen's Hospital. Medical regimen lowered her intraocular tension to relatively reasonable levels and a cataract extraction and iridectomy were

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performed with subsequent permanent control of tension. Since then, the blood pressure and diabetes have been under fair control, considering that the patient is rather erratic in taking her medications.

A 75-year-old woman was referred to the Straub Clinic with a history of nausea, vomiting, hypertension and left-sided headache of 2 weeks' duration. These symptoms were attributed to hypertension, which had apparently responded to therapy, but the nausea, vomiting and headache persisted. The internist noted that the patient was severely ill. Her blood pressure was only 130/70. Other pertinent findings were confined to the eyes. He noted that the patient had bilateral cataracts. However, the left cornea was steamy and the left globe was much firmer than the right. The patient was referred to the ophthalmologist and a diagnosis of glaucoma secondary to hypermature cataract was made. The patient was hospitalized, tension controlled medically, and 24 hr. later a cataract extraction and an iridectomy were performed. Subsequently, the patient has done well and resumed normal activities. A cataract extraction on the right side is scheduled in the near future.

The final case is of a somewhat different nature. A 56-year-old man complaining of a sore red eye, of some months duration, was seen initially at the Straub Clinic by the ophthalmologist. He had been a mild diabetic for about 10 years. An extracapsular cataract extraction had been performed on the right eye a year previously by another ophthalmologist. About 3 months before the present visit, another ophthalmologist had performed a peripheral irridectomy on the left eye for presumed narrow angle glaucoma. However, according to this ophthalmologist, the patient developed a persistent uveitis and the tension remained in the 30's and 40's despite therapy. Despite hospitalization during that time, the diabetes was very difficult to manage.

My initial examination revealed a normal pressure in the right eye, on which an extracapsular cataract extraction had been performed, and a Soemmering's ring was present. The left eye was running a tension in the mid-30's. Many mutton-fat keratitic precipitates and a heavy flare were present. An immature cataract was present. Funduscopic examination showed only red reflex. Diagnoses of endophthalmitis phacoanaphylactica and secondary glaucoma were made. These were made on the basis of the extracapsular cataract extraction on the right. The patient was hospitalized and the immature cataract extracted intracapsularly. The glaucoma and uveitis promptly subsided; good control of the diabetes was obtained; and the patient has done well and has good corrected vision.

SUMMARY

No physical examination can be considered complete without observing the eyes and their reactions and palpating the globes.

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SOME PITFALLS OF SURGICAL GYNECOLOGY

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Anyone experienced in performing surgical operations on various structures within the abdomen or pelvis can recall a number of misdiagnosed cases despite careful history taking and painstaking preoperative investigation. The more experience one has, the greater is the variety of obscure conditions that come to mind when one seeks to make a differential diagnosis. The gynecologist who lacks a general medical and surgical background, like the general or abdominal surgeon who is unable to think and act as a gynecologist under certain conditions, is unable to furnish the professional skill that our patients deserve. It is not always possible to have representatives of various specialties instantly available, especially in rural areas where frequently one must make instantaneous decisions and take immediate action. Likewise, precise diagnostic laboratory aids are not always at hand when the decision must be made within minutes.

Obvious, mistaken diagnoses, such as a diagnosis of an incomplete abortion for extrauterine pregnancy, a pregnant uterus for a smooth myomatous uterus, or even more commonplace, an overdistended bladder for an ovarian cyst, are too obvious to warrant more than passing mention. Most of these errors occur as a result of haste and pressure of work, with subsequent failure to take an adequate history or to examine the patient thoroughly.

The gynecologist must frequently don the robes of the proctologist, urologist, internist or psychiatrist. He must pay meticulous attention to bowel habits of the patient, particularly if she is of that age group where there is an increased incidence of diverticulosis, diverticulitis or malignant lesions of the large gut. An initial complaint of a red, itching vulva may disclose diabetes mellitus to the alert gynecologist. The surgeon who operates upon a woman without taking a careful gynecologic history is derelict in his duty. Too many appendectomies have been performed for simple ovulation syndrome, and too many corpora lutea have been labeled "ovarian cyst," with removal of the ovary or the physiologic lutein body. Space will not permit more than a brief enumeration of a few interesting misdiagnoses that have occurred during the past 24 years on the gynecologic service of the Straub Clinic.

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CASE REPORTS

Case 1. A 41-year-old Caucasian school teacher was first seen at the Straub Clinic in 1938 for headaches, purulent nasal discharge and diarrhea, and was placed on medical treatment. Surgery was advised for marked nasal obstruction from a deviated nasal septum, but this was not done.

She was transferred to the mainland and was not seen here again until October 1948, when this history begins. In the meantime, on the mainland, she had received the following surgery: (1) partial thyroidectomy; (2) cholecystectomy; (3) pelvic exploration with removal of appendix and one ovary; and (4) radium implantation in uterus for "functional uterine bleeding." The dosage and method of radium application were unobtainable. Low grade fever and multiple joint pains led the physician in attendance to carry out various laboratory tests, including blood cultures and agglutination tests for *Brucella abortus*. Chest x-rays were negative. Cervical and dorsal spine roentgenograms showed "minimal hypertrophic spurring with slight kyphosis of upper dorsal spine and no intrinsic bone pathology."

Menstrual history: onset at 13, always irregular. Radium menopause in 1941.

On pelvic examination at the Straub Clinic on October 25, 1948, the following observations were made: Virginal introitus. Vaginal examination through a small speculum showed normal appearing external os of the cervix. Papanicolaou smears were taken and were reported later to be negative for carcinoma. The "uterus" on rectovaginal examination felt the size of an 8 to 10 weeks' gestation and was in the midline with nodules varying in size from 2 to 4 cm. and arising mainly in the fundus. The "uterus" was moderately tender but fairly movable. No adnexal tumors were palpable (one ovary had been removed previously; it was not clear which one had been removed at this examination). It was felt that we were dealing with small myomas of no signifi-

cance in the over-all picture. There had been no menses or any abnormal vaginal discharge since the time the intrauterine radium had been given elsewhere a number of years previously. No treatment was advised at this time for the "uterine fibroids."

Medical treatments continued under her internist's care. Anemia was treated by blood transfusion and she was considered as a case of "probably mild rheumatoid arthritis." Nasal allergies and sinusitis received nonsurgical treatment.

On February 16, 1949, without further symptoms referable to pelvic organs, the patient was re-examined with regard to the status of her "uterine fibroids." The "uterus" was now considerably larger, 10 to 12 weeks' gestation in size, but freely movable, and there was no history of uterine bleeding. Cervical smears were negative for carcinoma. Pelvic exploration was advised and carried out at the St. Francis Hospital on March 3, 1949, with the preoperative diagnosis of multiple uterine myomas with possible sarcomatous changes. The nodular structure directly in midpelvis exerting pressure on the fundus of the bladder was re-examined under anesthesia. It felt like a typical myomatous uterus. A preliminary curettage yielded normal endometrium.

Upon opening the lower abdomen through a midline incision, a normal nulliparous uterus and adnexa were found, together with a prolapsed mobile cecum containing an obvious malignancy, instead of a myomatous uterus. The tumor mass, together with the uterus to the fundus of which it was adherent, corresponded in size to an 8 to 9 weeks' gestation. Right hemicolectomy and ileotransverse colostomy were then carried out by Dr. V. C. Waite who was called in to take over the case. Immediate recovery was satisfactory. She was last seen 6 years after operation when she was transferred to the mainland. She has not been heard from since.

Comment. A barium enema study in this case would undoubtedly have clinched the diagnosis before the operation, but we were thrown off the trail by the lack of intestinal symptoms and the atypical location of the cecum, with the pelvic findings so characteristic of a myomatous uterus. The adhesions were probably due to radiation reaction.

In any case where the diagnosis of ovarian cyst (excepting, of course, the very large ones) is made, a dilated, freely movable cecum or sigmoid colon may be discovered instead, as these conditions are often totally asymptomatic. In one young, single, Hawaiian-Caucasian woman, the "10- to 12-cm. right ovarian cyst" was proved to our chagrin to be an unusually mobile, dilated, large sigmoid colon lying to the right of the uterus. This patient had been under examination repeatedly by several careful observers, and even a repeat pelvic examination under anesthesia just before incising the abdomen failed to shake our preoperative diagnosis of right ovarian cyst.

The following case was misdiagnosed as ruptured tubal pregnancy. This condition is at times capable of assuming a very bizarre and misleading picture, especially in a woman approaching the menopause.

Case 2. A 42-year-old Portuguese multipara was admitted in shock to the Gynecological Service of The Queen's Hospital on March 3, 1937. She had collapsed and was picked up on a street in shock and rushed in by ambulance. With difficulty, the history was obtained of amenorrhea of 6 to 8 weeks, nausea and severe midabdominal pain which became localized deep in the pelvis. On bimanual pelvic examination, marked bulging and fluctuation were noted in the cul-de-sac and agonizing tenderness was noted on shifting the cervix. There was no vaginal bleeding and due to the marked pain elicited, the uterine body and adnexa were not clearly outlined. The picture of acute anemia, together with a high leukocyte count with a predominance of neutrophiles, convinced us that we were dealing with a ruptured tubal pregnancy or a ruptured ovarian cyst. No cul-de-sac aspiration was done.

As soon as the initial shock had been controlled, the abdomen was opened through a midline subumbilical incision. To our surprise, a sour odor was noted on incising the peritoneum and much grayish fluid was found in the cul-de-sac. There was no free blood and a normal nonpregnant uterus and adnexa were noted. The source of the fluid was found to be a perforated ulcer on the lesser curvature of the stomach. This was closed by two layers of Lembert sutures. Convalescence was stormy, requiring drainage of an upper abdominal subhepatic abscess 3 weeks later.

Comment. When the patient was well enough, a detailed history was taken which would have called our attention at once to the stomach as the probable source of her trouble. Aspiration of the cul-de-sac would, indeed, have caused wonder as to the character of the fluid that would have been obtained. With the acute tenderness on shifting the cervix and with low red and high white counts, we responded as we have been

taught to respond in the presence of a ruptured ectopic pregnancy or ruptured ovarian cyst. The low red cell count was due to anemia of long standing and her menses had been irregular for years.

Another type of case that often causes confusion with adnexal disease is sigmoid diverticulitis. Whenever one is dealing with suspected left adnexal disease, this condition must be ruled out, especially in women in their 40's and over. However, when sudden pain strikes in the middle of the night with agonizing tenderness on shifting the cervix on pelvic examination and the blood picture resembles that consistent with free blood in the pelvis, the diagnosis is apt to be made in the operating room. The following is an example.

Case 3. A 46-year-old Portuguese multipara had menstruated regularly until 6 weeks before the present illness. A good general surgeon examined her and she was referred to our Gynecological Department, with the tentative diagnosis of ruptured ovarian cyst or ruptured ectopic pregnancy. Routine preoperative history, physical findings and routine laboratory tests supported the referring surgeon's diagnosis. Upon opening the abdomen, a normal nonpregnant uterus and adnexa were seen; an acutely inflamed diverticulum proved to be the source of the trouble. The case was returned to the referring surgeon at five o'clock in the morning for further treatment!

Comment. Sigmoid diverticulitis and carcinoma occur often enough for us to feel it wise to urge more frequent use of the proctoscope and the barium enema in nonemergency cases. This would eliminate a good many errors. Obesity often limits the accuracy of the bimanual examination. Culdoscopy is another aid that could be used more often where time permits and the symptoms are not too urgent.

Sudden release, deep in the pelvis, of the contents of an endometrioma, or a slightly tender corpus luteum, may easily be confused with an ectopic pregnancy; and unless the symptoms point to severe internal hemorrhage, repeated pelvic examinations, blood counts and continued observation are in order. Mere unilateral tenderness and a skipped menstrual period are not in themselves adequate reasons for opening the abdomen.

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EXPERIENCES WITH TRAUMATIC SUBDURAL HEMATOMA

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Traumatic subdural hematoma is a welcome neurologic diagnosis, since it usually carries a favorable prognosis. Ideally, it can represent a simple straightforward diagnosis, and treatment may be easy, with the patient making a dramatic recovery in a matter of minutes. But it may present a difficult diagnostic problem and the surgical procedure for cure may be formidable.

This paper deals with the 60 patients with subdural hematoma, acute or chronic, who have come under my care in the past 10 years (1949–1959). Patients with associated injuries, which were usually the cause of the high mortality, are all included. Practically all operations, including simple burr holes, were done by the author, as no neurosurgical residents were operating where the patients were hospitalized. The patients include charity, private and Workmen's Compensation cases.

Working alone, one follows his patient's course very carefully and knows every detail of each operative procedure. The personal observation of patients has led to certain changes in treatment over the years which seem worth recording.

TYPES OF PATIENTS

The patients seen varied in age from 2 weeks to 84 years. There were 45 men and 15 women. A history of injury was obtainable in all but 3 patients, 2 of whom were infants under 5 months, whose lesions can be attributed to birth.

The presenting sign or symptom was one or more of the following: headache, coma, malnutrition, convulsions, fever, listlessness, weakness, enlarging head size, stiff neck, blurred vision, mental confusion, poor coordination, hemiparesis, personality change or vomiting. Symptoms were present anywhere from 1 hr. in a 37-year-old man who was in a "stock car" racing accident, to 11 months, in a 16-year-old boy who had suffered a head injury in an automobile accident almost a year previously. There were 14 patients under 5 years of age. This paper will not deal specifically with the problem in infancy since this was extensively covered by Ingraham and Matson,[1] and my personal experiences were reported in the *Hawaii Medical Journal*.[2]

Almost half (27) of the patients had had symptoms for 4 days or less, indicating the acute situation in a large percentage of these patients. Many patients were seen immediately after accidents when the effects of alcohol and concussion made immediate diagnosis impossible, and one could only observe the patients for the development of localizing signs to establish the diagnosis.

DIAGNOSIS

Diagnosis is based on a careful history, which in this series indicated trauma in all but 3 patients. Subsequent history depends on the site and rapidity of enlargement of the lesion. Innumerable symptoms, as noted above, may be elicited.

Physical examination in proved cases may be entirely normal or the patient may be comatose. Any one or combination of the following signs was found: emaciation, coma, lethargy, various cranial nerve palsies, hemiplegia, a dilated fixed pupil, papilledema, a tight fontanel or "cracked pot" sound over the cranial sutures in children, stiff neck, mental confusion and decerebration. An evaluation of the history plus the presenting signs determine what further diagnostic tests to use. The rapidity of change in the patient's status indicates the urgency of the situation.

Roentgenograms of the skull are practically always used. As well as showing evidence of trauma, such as various fractures, roentgenograms may show a shifted calcified pineal gland or choroid plexus, separated sutures, or in long-standing lesions, erosion of the sphenoid wing or clinoids or actual linear calcification in the capsule of the hematoma. Simple fractures indicate trauma but are not of any localizing value as to the site of a possible hematoma.

Lumbar puncture was done in only 11 of the 60 patients. It is contraindicated in the presence of increased intracranial pressure and may precipitate a rapid change in the patient's course

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even when there is no increased intracranial pressure, as shown by the following patient.

CASE REPORT

A 65-year-old Japanese widow, hospitalized because of headache of 2 weeks' duration, was seen in consultation the next day. She had had a mild accidental blow on the head one week before the onset of headaches. Neurologic examination was normal, as was a roentgenogram of the skull. A lumbar puncture showed an initial pressure of 120 mm. of water with normal dynamics. The spinal fluid showed 5 lymphocytes and a total protein of 43 mg. per cent.

The patient developed semicoma and a grasp reflex 42 hr. after the lumbar puncture. Immediate burr holes showed a normal brain on the right but a large frontoparietal, temporal subdural hematoma on the left. This was evacuated by thorough irrigation through burr holes, and the brain, which had been depressed about 1 cm., expanded nicely. The patient was discharged asymptomatic 12 days later. The subsequent history illustrates the reasons why my present treatment is different from that used in this patient.

The patient developed alternating periods of weakness and lethargy over the next 2 weeks. She was readmitted to the hospital, 17 days after the original burr holes, at which time she showed no evidence of papilledema and no localizing neurologic signs. Craniotomy revealed a huge subdural hematoma. The contents of the hematoma and the enclosing membranes throughout the extent of the dural opening were removed completely. The brain expanded nicely. The large epidural dead space was drained for 24 hr. at the edge of the craniotomy.

The patient became aphasic and hemiparetic 3 days later. Reoperation showed a large accumulation of fluid and blood in the epidural space. This time a drain was led out through a new burr hole at the center of the bone flap where the epidural dead space was deepest. The drain was removed in 24 hr. The patient made a complete recovery and has remained well since.

Comment. The only sure method of diagnosis is to expose the subdural space through burr holes, or, in infants, subdural taps. Subdural taps or burr holes should always be made bilaterally because of the frequent occurrence of bilateral hematomas. In this series, bilateral hematomas occurred in 16 or approximately one-fourth of the patients. It sometimes requires multiple burr holes to locate a subdural hematoma and the position of the head necessary to make these openings is often not the most advantageous if a major procedure is to follow. Recently I have been using angiograms more frequently and find them most satisfactory in localizing the lesion. Air studies and electroencephalograms have not been used in the series.

TREATMENT

The aim of treatment is obviously to remove as completely as possible the mass of the hematoma and its surrounding membranes. Incomplete removal of the membranes may lead to reaccumulation of the encapsulated fluid, as illustrated in the case presented. Treatment must therefore be individualized.

The use of simple burr holes and irrigation of the subdural space is seldom adequate permanent treatment if membranes are present. It may be adequate in fluid hematomas without clots (often called subdural hygromas) and may be life-saving as an initial emergency procedure in acute subdurals or very large subdurals where one wishes to permit gradual re-expansion of the brain. Increasing experience has encouraged me to do craniotomies more often and the results have certainly justified the more radical procedure. Simple burr holes alone, with irrigation of the subdural space, was the treatment given in 33 of the patients reported.

If burr holes reveal bilateral hematomas with clotted blood or thick membranes, I frequently wash out as much blood as possible as an initial procedure and do an elective craniotomy later when one can start with the patient properly positioned for craniotomy. If preoperative angiograms demonstrate the location of the hematoma, one can proceed directly with a craniotomy, confirming the suspected diagnosis by opening the dura when the first burr hole for the craniotomy is drilled.

Lumbar puncture and the injection of saline in the subarachnoid space during surgery is done whenever the brain fails to re-expand after removal of a clot. This has been done in 9 of the 60 patients. As much as 160 cc. of saline were injected in one instance.

CRANIOTOMY TECHNIQUE

Experience has proved some details in craniotomy technique to be very important. Preoperative localization of the general position of the hematoma by angiography or burr holes is helpful in properly placing the craniotomy, as the thickest portion may be frontal, temporal,

high parietal or, rarely, occipital. The craniotomy opening does not need to cover the full extent of the clot to secure a cure. If the outer membrane is thick and vascularized and bleeds readily, it is opened 1 to 2 mm. inside the dura if the clot extends outside the exposed dura. In this way, the bleeding edge of the subdural membrane can be coagulated or clipped to the dural edge to secure hemostasis.

The inner membrane is never disturbed until the contents of the hematoma are removed completely. The inner membrane is then removed as completely as possible. If it is adherent to the arachnoid or extends for some distance under the dura, its continuity is broken by radial cuts so it will not prevent the brain from re-expanding. Injection of saline in the lumbar subarachnoid space will re-expand the brain if it does not do so spontaneously.

In large hematomas, in spite of lumbar injections, a large epidural dead space often remains after the dura is closed. Formerly, this was drained at the margins of the bone flap, but in several instances re-exploration was necessary because of postoperative extradural fluid collections, as illustrated in the case presentation. In this situation today, an extra burr hole is made where the epidural space is deepest, usually at the parietal protuberance, and a drain is led directly out through a stab wound through the scalp. The dura is always closed tightly. No complications have occurred with this method.

Hypothermia was used in one patient with cortical contusions as well as hematomas. Unquestionably, the refrigeration blanket was responsible for controlling his hyperpyrexia; all other methods had failed. He recovered with moderate residual spasticity and personality changes. Urea for controlling intracranial pressure has not been used in these patients.

MORTALITY

Of the 60 patients, 14 died. Of these, 1 died 3 days after surgery and 1 died 2 days after surgery; all the rest died within 36 hours after surgery. Possibly some of the earlier patients could have been saved with hypothermia or urea, or both. All patients who died had extensive cortical or cerebellar contusions, lacerations, or both. After study of the findings at surgery and in many instances at autopsy, I feel the associated brain injuries caused the deaths in all but one instance.

The one exception was a 5-month-old baby with bilateral subdural hematomas. Repeated bilateral subdural taps followed by bilateral burr holes had been done. An attempt was made to evacuate the subdurals at the time of the bilateral burr holes. When it was felt the patient was in proper condition, an easy right-sided craniotomy with removal of a moderate-sized hematoma was done without incident. Shortly after recovery from anesthesia, respirations became irregular and the patient expired. Postoperative examination showed a huge multilayered left-sided hematoma which had caused axial deviation of the brain stem after removal of the right-sided hematoma. I feel this was a preventable death and indicates the wisdom of partial drainage of bilateral or large unilateral hematomas by burr holes as an initial procedure. This gives the distorted brain a chance gradually to resume a more normal position in the cranial cavity and may prevent the disastrous sequelae of a sudden shift if craniotomy is done initially.

RESULTS

Approximately 70 per cent, or 32 of the 46 patients surviving surgery made an essentially complete recovery. The remaining 14 patients had significant headaches, mental changes, athetosis, some degree of hemiparesis, or other partially disabling residuals, many of these estimated at 10 to 20 per cent permanent partial disability. As noted in the introduction, all patients with subdural hematomas, regardless of other injuries, are included in this series. Uncomplicated subdurals, except the massive acute ones, should have a good prognosis; most residuals are due to associated brain injuries.

SUMMARY

Personal experiences with 60 patients with subdural hematoma are reported. Initial drainage and subsequent excision of certain hematomas, with direct drainage of the epidural space postoperatively, are advocated.

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EMOTIONAL PREPARATION FOR HOSPITALIZATION

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Much has been said and written concerning the need for the psychologic preparation of a child for hospitalization, whether for surgery or for medical treatment. Little has been written or said of the actual mechanism or dosage of the psychologic preparation. Doctor Gofman, and her associates[1] indicate in their study that 75 per cent of the children are unprepared for hospitalization. To determine what should be said to the child, a few generalizations need to be discussed.

GENERAL PREPARATION

Words and feelings. To a child under 2 years of age, words may mean little; but if these words are directed to the child rather than to the parents and are said in an honest and sincere way, the child will get the idea that something is going to happen that may not be pleasant, but has to happen, and that everything will be done to make it as easy as possible. I am convinced, as Doctor Grover Powers[2] is, that "young children understand more of our words than we realize" and "a great deal of information and misinformation reaches them by the inflection of the voice, by actions and manners and by general demeanor." Most children of 3 or 4 years can gain some understanding. I believe as early as 2 years, or even earlier, they can get a feeling of reassurance from the way they are handled and talked to.

After a child is 2½ years of age, explanations of what is going to happen must be spelled out, both with words and gestures. The amount of detail depends upon the child's reaction to the explanation. It will be evident whether he is grasping the points that one needs to get across. If he is not grasping the point, much repetition may be needed. We cannot take it for granted that the child knows what tonsils are or what pneumonia is. Most children do not know, or they have preconceived erroneous ideas of their bodies and illnesses.

Timing. Explanations concerning anticipated procedures must not be given too long in advance because the younger the child, the less time means. It should not occur longer than 3 to 4 days before hospitalization and should be repeated at least once before entry to be sure the child understands all steps. In emergencies, even a few seconds of talking directly to the patient will help immeasurably in both his emotional acceptance of procedures to be done, and the cooperation one may expect from him.

Fear and the unknown. Fear is a perfectly normal emotion. The child should know it is all right to be afraid, and that he need not feel guilty or ashamed of his emotions. Adults as well as children are afraid, and this should be pointed out to the child. He may be afraid of pain, of separation or of the unknown, and all these may be brought out.

Reassurance. An honest evaluation of the total hospitalization experience is needed and appreciated by the patient. The procedure anticipated is thoroughly explained, and he is told that he will be informed *before* any other procedure is carried out. There should be *no* surprises, or the confidence of the child in his physician will be jeopardized. Nurses in the hospital should be tuned to this, and they should always tell a child what is going to happen. Exact words will vary, depending upon the physician as well as the response of the child, but the points enumerated above should be covered.

PREPARATION

Preparation of a child for a tonsillectomy and adenoidectomy will be used as an example to demonstrate the method I use. The same principle is used to prepare children for other hospital experiences.

When the decision to have a tonsillectomy is made, I explain first to the parents that I wish to talk directly to the child, since he and I must work together. The parents may listen, and when we are through, they may ask any further questions. These, too, are discussed in the presence of the child. I ask the parents not to try any preparation by themselves until I give them the clues.

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It is wise to talk directly to the patient at the same physical level or even looking up to him. Towering over the child is found less effective than being at his eye level.

Dosage

Jim, you have had a lot of trouble with your tonsils, and it has been decided that they should be taken out, and I am going to take them out. You don't have to *want* your tonsils taken out, but it must be done, so let's work together to make it as easy as we can. Mommies and daddies, as well as boys and girls, are afraid of things they don't know and it is perfectly okay to be afraid, but if we know about what is going to happen, then we don't have to be *as* afraid—that is why I am going to tell you all about it.

Do you know how many tonsils you have? One? Most boys and girls think they have only one, but they have two, and they are right there and there (point to appropriate areas on the outside), but they are inside your mouth. They are about so big (use sign language). They are your tonsils, and have given you lots of trouble, so I am going to take them out. It is not going to be fun to have your tonsils taken out, but if we work together we will make it as easy as we can.

Now, this is Monday, tomorrow is Tuesday, and the next day is the day you will come again, about three o'clock in the afternoon, so I can check you again (indicate days of the week with fingers since time means so little to children). If everything is okay and you haven't caught a cold, Mommy will take you to Children's Hospital, where another doctor is going to examine you. Children's Hospital is a very nice hospital to which lots of boys and girls go to have their tonsils taken out.

After the resident doctor is finished looking you over, the nurse will take you and Mommy up the elevator to the ward where you will have a bed near the other boys and girls who are going to have their tonsils out.

You can eat what you want of the dinner that will be served soon after you get there. Then Mommy must leave, and you will stay with the other boys and girls. Perhaps you can watch TV or play with your toys until it is time for you to go to sleep. In the evening, a nurse from the laboratory will come to check your blood. She will prick your finger like this (demonstrate with finger). You say "ouch" as it will hurt a little bit, but after the poke it will not hurt and you may watch the nurse do things with the drop of blood. There will be no other shots and when the nurse tells you to go off to sleep, you try to go to sleep. We know it is hard sometimes to go to sleep in a strange bed and in a strange place without Mommy and Daddy, so if you can't go to sleep you ask the nurse for something to help you go to sleep.

When you wake up in the morning, you can't have breakfast, a glass of water, or even brush your teeth until after I take your tonsils out. You will have a poke (injection or shot) in the arm soon after you wake up. You say "ouch" again, as it will hurt a little. It is not a big poke, but a little one.

When it is your turn, the nurse will put you on a cart and take you down the hall to the operating room. This is just a room where we take tonsils out. When you get inside, you will see it is painted green and the nurses will be wearing green gowns and white masks. I will be dressed in green, too, green cap, green shirt and green trousers. I have a white mask and I wear my glasses and a light strapped to my head like a miner.

From the cart, you will be put on the operating table where you will lie down and go to sleep. They have a strap for your legs just like on the airplane. A man or woman will put you to sleep by giving you something to smell from a mask. It doesn't smell good, but it is not too bad and better than it used to be. You smell it and blow it out and pretty soon you will be fast asleep. While you are fast asleep, I will open your mouth and take your tonsils out. It won't hurt when I take your tonsils out because you will be asleep.

When you wake up, you will be in another room called the recovery room where we have a special nurse to help you wake up. When you wake up you will have a sore throat here and here. There is nothing I can do about it, and it will be sore. If you want to cry, you go right ahead and cry. Bigger boys than you cry and it is perfectly all right to cry, but try to cry softly because if you cry loud then it hurts more. Also, when you wake up your tummy may feel upset as if you want to throw up. If you feel that way, then go ahead and throw up. They have lots of clean towels. Then you will feel better. If you throw up, there will be some blood in what you throw up—don't let it frighten you, as I expect it. I would be surprised if there weren't any.

When you have awakened, the nurse will take you back to where you started, and Mommy can come to spend the rest of the day with you. If she must leave to go and get a glass of water, she will wake you and tell you, because I don't want you to wake up expecting her there and not seeing her.

Later you can have some ice cream and when I come to check you, if everything is okay, you can go home. If it is not, then you must stay. I will have to look in your mouth. I know it is sore and

you know it is sore, but if you will sit up, put your chin up and open your mouth a little bit and pant, I can put your tongue down a little, very gently, and take a look, and it won't hurt. Let's practice.

Now, Jim, are there any questions that you want to ask? You talk it over with your mommy and daddy and when I see you on Wednesday, you can ask me if you think of any.

The above example of my preparation takes about 5 minutes, depending upon acceptance of the child. If the child is crying, one must repeat sentences between cries, and I have frequently had the parent hold the child while I give suggestions and repeatedly say that it is all right for them to cry. If there is marked emotional disturbance at the first interview, suggestions are repeated until the child apparently grasps the reality of what is to happen.

It is well to have no interruptions from telephone calls or from others dropping in because these would interfere with the sequence of the story. Different hospitals have different routines, so that any preparation must vary accordingly.

RESULTS

How does one evaluate the success of his preparation? When a child is seen on the second postoperative day and spontaneously gives you a big hug, then all one's efforts are rewarded.

It should be said that with a successful preparation the induction of anesthesia is smooth and the immediate recovery is also smooth. It seems that more frequently than not, if the child goes down fighting, he is apt to come up the same way.

SUMMARY

The days of subjecting the unprepared child to hospitalization for any reason should be gone. When one does prepare a child, he must include acceptance of the child's emotions of fear, the unknown, separation, mutilation, punishment and pain. If the child is told what is going to happen in a sincere and honest way, so that there is no doubt in his mind what he is to expect, then he will surprise his parents and his physician by how well he can "take" the experience.

I have the greatest faith that when the "chips are down" children are up to the challenge and grow up with the experience rather than being harmed by it, if properly prepared.

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APPENDICITIS DURING PREGNANCY

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Even though appendicitis complicating pregnancy is an infrequent clinical picture confronting the average obstetrician, it is still the most frequent abdominal surgical complication of pregnancy. It is by far, with the exception of cesarean section, the diagnosis most often made before opening the abdomen of a pregnant woman.[1] It is also a serious abdominal condition and even more serious during pregnancy.[2]

During the past 10 years (1949 to 1958), a preoperative diagnosis of acute, chronic or recurrent appendicitis was the reason given for performing 35 laparotomies at the Kapiolani Maternity and Gynecological Hospital in Honolulu. During this time at this same hospital, there were 39,867 deliveries. In other words, there was an average of one case of "appendicitis" for every 1140 deliveries. Of these 35 appendectomies, a pathologic diagnosis of some form of appendicitis was made in only 26 instances,† or in about 75 per cent of the cases operated upon. Therefore, the incidence of pathologically confirmed appendicitis in this series was 0.065 per cent or once in about every 1500 deliveries. This coincides with the averages reported in the literature of about 0.07 per cent to 0.1 per cent.

During the first 5 years (1949 to 1953) 21 of the above-mentioned appendectomies were performed, and of these, 13, or 62 per cent, were pathologically classified as appendicitis. However, during the last 5 years (1954 to 1958), out of the remaining 14 appendectomies in this series, 13, or 93 per cent, were found to have some form of appendicitis. There were 1 case of "early acute appendicitis," 6 cases of "acute appendicitis," 5 cases of "acute suppurative appendicitis" and 1 case of "acute gangrenous appendicitis." All cases were operated upon before rupture of the appendix had occurred.

REVIEW OF CASES

Trimesters

Of the 26 appendicitis cases, 10 were in the first trimester; 8 in the second; and 7 in the third. The difference here, even though the number of cases is small, is so little that one must conclude that appendicitis can be as common during any one trimester as it is in the other two. This, however, is not the general opinion; many authors feel that it occurs more frequently during the first and second trimesters. Doctor Frank R. Smith of New York also reported that the statisticians of the New York Lying-In Hospital found that the incidence of appendicitis during pregnancy is exactly the same as in nonpregnant people, but that it was more common in the first two trimesters.

Laboratory Findings

In the 26 cases of appendicitis, all but one white cell count was above 10,000; most ranged from 13,000 to 18,000. In 85 per cent of these cases, the poly count was 80 per cent or above. Nothing significant and no microhematuria were found in the urine; however, acetonuria was present in many of the cases.

Incision and Anesthesia

In the cases of early pregnancy, a midline or McBurney incision was used in almost all cases. However, in the later months of pregnancy, a lateral transverse incision at about the level of the umbilicus seemed to give the best exposure. During the latter months it is wise to make the abdominal incision at the level of maximal tenderness rather than to expect, as we are often taught, that the appendix is always displaced progressively upwards during pregnancy. The appendix may even be in the cul-de-sac during the last trimester, and in one of many cases operated on at 8 months, it was found to be in its normal position.

Spinal anesthesia was used in the majority of cases, but there seemed to be no marked difference in the postoperative course of those having the spinal anesthetic over those receiving a general one. Whatever anesthetic agent is used, one must be constantly aware of the more serious implications that anoxia has for the unborn child.

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† Five of these cases were those of the author.

Postoperative Course Uneventful

The average postoperative stay for the pathologically proved appendicitis cases was 5.3 days as compared to 5 days for the nonappendicitis ones. There was 1 death due to acute heart failure in a case of acute appendicitis. This was in a 26-year-old Japanese woman with a bad rheumatic heart and in her 7th month of pregnancy. Her death occurred suddenly just when it was thought that she was over the worst of her acute failure. There were no complications in any of the other cases. No case aborted or even threatened to abort.

I noted that during the first 5 years of this series, it was the usual custom to use "homeopathic" doses of progesterone of from 5 to 10 mg. intramuscularly daily, supposedly for the purpose of averting the onset of an abortion or miscarriage, and, also, to use penicillin "prophylactically" after surgery. Antibiotics were still used postoperatively in 66 per cent of the second 5-year cases, but progesterone, now in much larger doses, was given in less than one-third of the cases. Since none of these cases aborted or even threatened to go into labor, it makes one wonder whether the routine use of progesterone is of any value.

The use of prophylactic antibiotics has become outmoded after the work of recent investigators, and I definitely feel that after appendectomies during pregnancy they should be used only when indicated. In none of these cases was there any postoperative sepsis, and in the worst case—acute gangrenous appendicitis with signs of impending rupture—no antibiotics were used. In most cases the use of the above medications fails to reduce morbidity, but on the other hand, increases the cost of hospitalization and in certain sensitized or allergic cases may do much harm.

Symptoms Different in Last Trimester

The evaluation of symptoms referable to the abdomen and the gastrointestinal tract during early pregnancy is often confusing. This has been reported as being especially true in cases of acute retrocecal appendicitis or in cases in which the appendix is high in the region of the right kidney. However, in reviewing and evaluating the symptoms of this reported series of cases, I was struck by the frequent finding of two almost distinct types of symptomatic reaction, a fact which I was unable to find reported in any of the previous articles on this subject.[3]

One type occurs in the earlier trimesters and another during the last trimester. The symptomatology during the first 5 months of pregnancy was quite similar to the usual symptoms found in appendicitis in the nonpregnant; *i.e.*, there was a gradual onset, first with generalized abdominal pains accompanied by nausea and sometimes vomiting, which was then followed by the localization of pain in the right lower quadrant and with, almost always, the finding of rebound tenderness over or near McBurney's point.

The picture in 5 of the 7 cases operated upon during the last trimester was quite different. The onset here was quite sudden with the first pain occurring in the right lower abdomen. Some of these patients were suddenly awakened at night with pain which was so intense that it prevented further sleep. The pain was more cramplike, and these patients were much more uncomfortable than those seen in the earlier months of pregnancy. The point of maximal tenderness was usually above McBurney's point and also more lateral. However, in only a few cases was it above the level of the umbilicus.

As to the cause of the symptoms in the operated cases which did not have appendicitis, one can only conjecture. Two of the nine cases, however, did have significant microhematuria, and one might assume that the symptoms of these and probably of others were ureteral in origin. Although it has been reported, microhematuria was not found in any of these cases of true appendicitis. Therefore, the finding of microhematuria should not be considered as being the usual thing, and the possibility of genitourinary disease should be investigated further.

It is also noted that the abdominal pain took longer to develop, was more intermittent in nature, and radiated into the leg in one case and the iliac crest in another. In the true appendicitis cases, there seemed always to be a definite start and definite progression of the symptoms.

DISCUSSION

In reviewing these cases, I was impressed by the fact that in almost every case in which the appendix showed no inflammation pathologically, the surgeon's description of said appendix was that of an inflamed appendix. There is apparently

a need here for establishing some criteria for the appearance of an acute and normal appendix.

I also noted with interest that during the first 5 years, only 38 per cent of these appendectomies were done by obstetrician-gynecologists, whereas in the last 5 years this had increased to 85 per cent. This seems to follow along with the changing of the character of the staff at Kapiolani Hospital:* during the last 10 years, the percentage of babies delivered by specialists has increased from 35 to 59 per cent.

One wonders whether the difference in the symptomatology of appendicitis during the first half and second half of pregnancy can be due to the fact that the omentum does not become involved in the acute process in the latter cases. Perhaps it is the omental reaction which causes the early diffuse abdominal pain usually seen in the ordinary case of appendicitis and in the cases which occur early in pregnancy. Without this omental reaction or walling-off process, or both, the pain seems to come on suddenly and is immediately localized to the right side. In several of the cases, this happened at night when the patient turned in bed. This changing of position perhaps abruptly shifts the acutely inflamed appendix which then comes in contact with the parietal peritoneum for the first time and thereby causes the sudden occurrence of symptoms.

Again, it is well to reiterate that a well timed and properly executed appendectomy, with the least possible manipulation of the uterus regardless of the stage of gestation, is the only treatment for appendicitis during pregnancy. Pregnant women can tolerate major surgery as well as nonpregnant ones, and once the diagnosis has been made, there should be no delay in proceeding with the proper treatment. Delay only increases morbidity, mortality and fetal loss.

Let us not forget that appendicitis also occurs during labor and in the immediate postpartum period. Here the diagnostic problem is compounded because the contractions of the parturient or involuting uterus can tragically mask the symptoms of acute appendicitis.

*Kapiolani Maternity and Gynecological Hospital is an open-staff hospital.

SUMMARY

1. Thirty-five appendectomies done at the Kapiolani Maternity and Gynecological Hospital during the past ten years are reviewed and discussed.

2. A frequent and definite difference in symptomatology between the cases of appendicitis occurring in early pregnancy, and those occurring during the last three to four months, is noted.

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PROSTATIC OBSTRUCTION IN HAWAII: SURGERY AND ETHNIC DISTRIBUTION

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Hawaii's population is made up of many ethnic groups, including Caucasian, Japanese, Chinese, Korean, Filipino, Hawaiian, Portuguese, Puerto Rican, and mixtures of these. Of considerable interest to the medical profession here has been the incidence of certain diseases in these various groups, notably the unusual frequency of carcinoma of the stomach in Japanese. Fibro-adenomatous disease of the breast is common in Japanese women, whereas breast cancer is not. Filipino men are prone to hyperuricemia and gouty arthritis. Other less striking examples are also seen.

It has long been thought that benign prostatic obstruction in Oriental men, particularly Japanese, is relatively rare, and certainly prostatic surgery for benign prostatic hypertrophy in this group in past years has not been frequently undertaken. When I began practice here a few years ago, I was advised by older colleagues that I would not see many prostate cases, since about 60 per cent of the population was of Oriental extraction and prostatic disease was uncommon in the Oriental. Prostatectomy ordinarily constitutes an important segment of the average urologist's surgical practice, and if this statement were true, the urologist in Hawaii might well expect to feel the effects of this difference.

It has gradually become apparent to me, however, that the resectoscope has a useful place here as well as in the mainland United States, and that prostatic obstruction may be a significant entity in Hawaii not only in the Caucasian, but in the Oriental and Polynesian as well. With this impression in mind, a review was made of the cases that I have operated on since beginning practice here. In addition a survey was undertaken of all patients having had prostatic surgery during the past 5 years at the two largest private hospitals here in Honolulu. Although the total number is not large, I feel that certain conclusions concerning relative incidences can be drawn.

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DIAGNOSTIC CONSIDERATIONS

Complete urologic study was undertaken on all patients who were operated on by me. The usually presenting complaints were urinary frequency, nocturia and slow urinary stream. In addition, at times hesitancy, dribbling, incontinence, painful urination and gross hematuria were noted. A relatively small number of patients were first seen in acute urinary retention. Complete physical examination accompanied by rectal palpation of the prostate was followed by catheterized residual urine determination. It was felt that a residual urine of 2 ounces or more was usually of significance.

Further urologic and laboratory study including urinalysis, complete blood count, phenolsulfonphthalein excretion, and blood urea nitrogen; excretory urography, endoscopy, and at times retrograde cystography were done routinely in each patient whose history and preliminary examination indicated significant prostatic or bladder neck obstruction. All patients who came to surgery also were studied from a general physical standpoint, with chest x-ray, bleeding, clotting and prothrombin times, and usually electrocardiography and medical consultation.

Patients selected for surgery generally showed several of the following criteria: poor urinary stream, nocturia and frequency, residual urine of 2 ounces or more, and endoscopic evidence of bladder neck obstruction with bladder wall trabeculation or cellule formation. Other signs and symptoms were often but not always present.

It should be emphasized that, although prostatic enlargement on rectal examination was often noted, the presence of a prostate which did not feel appreciably enlarged did not discourage further urologic study in those patients with symptoms of bladder neck obstruction. This, I believe, is a most important point, as it

will be evident from the following data, that the size of the prostate as measured by weight of the surgically removed tissue was not related to the degree of obstruction. This statement is particularly applicable to the Oriental patients operated upon.

SURGICAL CONSIDERATIONS

The type of surgery performed depended primarily upon the size of the prostate. Transurethral resection was used for bladder neck contractures, median bars and smaller hypertrophies, open enucleation being reserved for large benign glands. My preference in open surgery has been retropubic prostatectomy. Transurethral resection has been the procedure of choice in advanced prostatic cancer, and total perineal removal in early prostatic cancer. Pre-operative estimation of gland size is usually possible by combining rectal palpation with the measured length of the prostatic urethra determined at the time of endoscopy.

POPULATION DISTRIBUTION

The population of Hawaii has been subject to constant change since the beginning of its

TABLE 1

Racial distribution of Hawaii's population (1950 census)

	%
Caucasian	20
Japanese	38
Hawaiian and part-Hawaiian	18
Filipino	13
Chinese	7
Korean	1
Puerto Rican	2
All others	1

TABLE 2

Racial distribution of Hawaii's male population, ages 35 to 74 (1949–1956 estimate)

	%
Total male population, 189,000	
Caucasian	22
Japanese	31
Hawaiian and part-Hawaiian	10
Filipino	27
Chinese	6
Other races	4

TABLE 3

Incidence by race of surgical prostatism (accumulated figures from Queen's and St. Francis hospitals, 1955 to 1959)

	%
Total prostatectomies, 394	
Caucasian	50
Japanese	14
Hawaiian and part-Hawaiian	6
Filipino	10
Chinese	15
Korean	4
Others	1

TABLE 4

Incidence by race of surgical prostatism, 1955 through 1959 (Straub Clinic series)

	%
Total prostatectomies, 145	
Caucasian	59
Japanese	19
Hawaiian and part-Hawaiian	8
Filipino	9
Chinese	4
Korean	1

TABLE 5

Operative procedure employed showing racial distribution (Straub Clinic)

	Open Operation	Transurethral Operation
	%	
Caucasian	29	71
Japanese	0	100
Hawaiian and part-Hawaiian	30	70
Filipino	16	84
Chinese	18	82
Korean	0	100

TABLE 6

Weight of removed prostatic tissue by race (Straub Clinic)

	Range	Average
	gm.	gm.
Caucasian	3.5–222	34
Japanese	3–57	14
Hawaiian and part-Hawaiian	4–121	31
Filipino	3–93	20
Chinese	13.5–60	33
Korean		5

recorded history. The original pure Hawaiian race has decreased in number and intermarried with the peoples that came one after another to Hawaii's shores—Caucasian, Chinese, Japanese, Portuguese, Filipino. It is gradually becoming more difficult to distinguish the ancestry of the younger generations, but fortunately for this study, the older men can still be identified "racially" with some accuracy.

Table 1 represents the results of the last census and is still the official status of Hawaii's populations. A recent authoritative estimate of our population breakdown for men over 35 is shown in table 2. Table 3 was obtained by combining figures showing all operations done for benign prostatic hypertrophy at Honolulu's two largest private hospitals, The Queen's Hospital and St. Francis Hospital, during the past 5 years.

TRIPLE INCIDENCE IN CAUCASIANS

Prostatectomies done by myself are represented in table 4. This group consists of 145 consecutive unselected operative cases, done only for benign prostatic hypertrophy, during the period of August 1955 to November 1959, which covers the years I have been in practice. It is apparent that, although the Caucasian race makes up only 22 per cent of our male population over 35, it accounted for almost 60 per cent of my patients. Likewise, it is also clear that the incidence of prostatism requiring surgery in the Oriental race is about one-third that which could be reasonably expected on the basis of population distribution.

Although the statistical significance of these small numbers is open to question, certainly the general trend appears quite clear, and it can without question be said that prostatism is much more common in the Caucasian than in Hawaii's other races. The evidence suggests that it may be as much as nine times commoner in the white race. However, it is also clear that Orientals, part-Hawaiians and Hawaiians make up a good-sized minority of the operative cases, and therefore deserve as thorough an investigation for prostatic obstruction as the Caucasians when the usual indications are present.

SMALLER GLANDS IN ORIENTALS

Table 5 shows the operative approach according to race and can be correlated with table 6, which shows the average weight of the removed prostate according to race. Obviously most large glands were removed by open prostatectomy and most small glands were handled transurethrally. Although an occasional Oriental patient may be found to have a moderately large prostate, it is evident that the great majority of these patients do not have much prostatic enlargement as reckoned by weight of removed tissue. Yet using standard criteria for operation, all of this series of 145 patients required prostatic surgery. Two facts are therefore obvious: (1) prostatism in the Oriental races is not uncommon, and (2) transurethral resection is usually practicable because of the small amount of obstructing tissue present.

SUMMARY

An attempt has been made to study the relative incidence of prostatism in the various races comprising Hawaii's population. The study was based on 145 consecutive unselected cases operated upon by the author, and it is realized that the series is too small to be of statistical significance. Certain trends are apparent, however, and the following conclusions seem justified:

1. Prostatic obstructive disease is almost three times as common in the Caucasian as in the Oriental races.

2. Marked prostatic enlargement is not frequently seen in the Oriental, and transurethral resection is usually the procedure of choice in this group because of the small amount of obstructing tissue present.

3. The commonly held impression that surgical prostatic obstruction is rare in the Oriental is not justified.

4. Since prostatism in the Oriental is by no means uncommon, urologic study is indicated in this group when symptoms suggest prostatic obstruction.

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TWENTY-FIVE HUNDRED PROCTOSCOPIC EXAMINATIONS

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During the past 3½ years, the Medical and Surgical Departments of the Straub Clinic have performed over 2500 proctoscopic examinations. A procedure book has been kept recording the results of these examinations with particular emphasis on any changes that should be classified as neoplastic. This report will summarize the findings of these examinations.

INDICATIONS FOR PROCTOSCOPY

The discharge of blood from the rectum is, of course, the most important indication for proctoscopic examination. Itching, rectal pain, prolapse or protrusion should also be considered an indication for this procedure. These complaints were the primary indication for the examination in the large majority of the patients included in this study.

Many patients subjected to this examination did not have local rectal complaints. Some were suspected of disease of the lower bowel, and had a proctoscopic examination as a part of a complete physical examination, in addition to the usual x-ray examinations. Any patient in whom there is an indication for barium enema x-ray examination of the colon should also have proctoscopy, preferably before the x-ray study.

About 500 of the 2500 proctoscopies reported here were done as a part of an "executive physical examination." This refers to a complete history and physical examination performed upon individuals who are presumably well and in good health and who are referred by their employers for routine annual examinations. Many of these examinations were repeated annually, and most of them included a proctoscopic examination at least at the initial work-up. The proctoscopy was repeated at subsequent annual examinations when significant disease was found, and in selected patients even when the initial examination was negative.

PREPARATION

Most of these examinations were done after preparation of the lower bowel with enemas. In certain patients examination of the unprepared bowel is indicated, particularly when the bleeding is suspected of coming from above the anorectal area. In our experience the number of patients who should be examined in this manner is small, and if this method is utilized, one should not be satisfied that a complete examination has been performed. Our experience with proctoscopy in the well prepared patient indicates that many small mucosal lesions would be easily missed in an unprepared or poorly prepared rectum and sigmoid. It the patient is to be examined without prior preparation, a subsequent second examination after a good cleansing of the lower bowel should be done before it can be stated that a complete inspection of the rectum and sigmoid has been performed.

Two general approaches to preparation have been used in this series of patients. Some were asked to administer cleansing enemas at home before coming to the office. In many instances this preparation has proved to give incomplete cleansing of the bowel and has been followed up by the administration of an office enema. A large number of patients were examined in the office at the time they were first seen with their presenting complaint, usually rectal bleeding. Examination was done after preparation of the bowel with a disposable office enema of the glycerin and phosphate variety. One or two of these enemas usually give complete cleansing of the bowel, thus making possible a complete, careful inspection of the mucosa of the rectum and sigmoid colon.

There are certain contraindications to preparation of this type. Patients who are suspected of having colitis or proctocolitis should not receive chemical enemas and probably not even cleansing enemas at home. In these circumstances such preparation may prove to cause considerable discomfort to the patient and perhaps exacerbation of the disease process. Certain lesions, because of their acute discomfort, also contraindicate the preparation of the patient in this way. Included in these would be rectal stricture, rectal prolapse, thrombosed hemorrhoids and fissure-in-ano. In many of these patients the

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proctoscopic examination can well be deferred until the patient has been anesthetized at the time of definitive surgery for the local lesion. At this time, proctoscopic examination can be done with safety, if care is used.

It is to be emphasized that proctoscopy should never be omitted from the complete examination of a patient with rectal complaints, but it may be postponed in deference to their comfort or safety.

EQUIPMENT AND METHOD

The term "proctoscopic examination" refers to an adequate, complete examination of the perianal area, the anal canal, the rectum and as much of the sigmoid colon as the patient's individual configuration and anatomy will permit.

I prefer to use a fenestrated anoscope for examination of the anal canal. This gives adequate visualization of such lesions as fissures, hemorrhoids, cryptitis and papillitis. However, this step in the examination may be omitted if no symptoms are referable to the anal area.

Examination of the rectum and sigmoid colon is performed with a 25-cm. proctoscope. The preference in our Clinic is for a distally lighted instrument of the Welch-Allyn type. This instrument is light and easily handled, and can be inserted with a minimum of discomfort to the patient. It does have the disadvantage that the small bulbs are easily broken or burned out. The illumination afforded permits identification of even the smallest mucosal lesions.

A good proctoscopic examination requires that a minimum of discomfort be imposed upon the patient and the operator. In addition, the patient must be placed in a position that is optimum for the insertion of an instrument as far as his anatomy will permit. The series of examinations being reviewed here began at the time our Clinic acquired an electrically operated sigmoidoscopic table. This table has certainly saved the examining physicians many backaches and kinks in the neck. In addition it has minimized discomfort and physical effort for the patient. Finally, the physicians who have used it are thoroughly convinced that it permits more complete examination of the given patient.

A complete proctoscopic examination should imply the insertion of the instrument to its full length, but in many individuals the angulations and turns of the sigmoid colon prevent this from being feasible. It should be emphasized that the examining physician should not discontinue his examination at the first sign of discomfort to the patient but should instead persist until he is satisfied that the anatomical situation will not permit its completion.

INCIDENCE

Executive physical examination category. A total of 2503 proctoscopic examinations has been reviewed in this series. These were performed for the various indications and circumstances enumerated previously. Those that were performed as part of a routine physical examination were thought to be of particular interest and have been tabulated separately, and the findings of this group will be summarized first.

Approximately 500 proctoscopies were of this type, namely, in the Executive Physical Examination category. Table 1 enumerates the incidence of the various lesions seen. It can be seen that 90, or 18 per cent, of these proctoscopic examinations revealed significant neoplastic disease in the rectum or sigmoid. These neoplastic lesions were noted in 68 patients. Of the 66 patients with polyps, 30 had a total of 48 annual follow-up examinations; 22 of these follow-up examinations revealed additional polyps and 26 were negative. This represents an incidence of 45 per cent of positive examinations in patients who had previously had all visualized mucosal polyps destroyed.

This incidence of 18 per cent of positive examinations seems unnaturally high and is probably influenced by the fact that the individuals in this group were predominantly Caucasian men between 40 and 65.

Unselected examination category. Table 2 illustrates the incidence of the various lesions seen in 2003 unselected proctoscopic examinations. The remaining examinations, almost 1200 in number, were recorded as negative.

The incidence of 158 examinations positive

TABLE 1

500 "executive" proctoscopies

	No.
Polyps	88
Carcinoids	2
Hemorrhoids	30
Other pathologic conditions	15

TABLE 2

2003 routine proctoscopies

	No.
Polpys	155
Hemorrhoids	442
Fissure-in-ano	83
Carcinoma	17
Other pathologic conditions	120

for polyps out of over 2000 proctoscopies is an incidence of 7.7 per cent and was noted in a total of 126 patients. Of these 126 patients, 38 had subsequent re-examinations 80 times. Of these re-examinations 32 were positive for polyps and 48 were negative, a positive re-examination rate of 40 per cent. These figures do not include one patient with multiple polyposis who had 19 proctoscopic examinations, only 3 of which were negative.

In this group of patients the sex, age and racial distribution is of considerable interest. Table 3 shows an analysis of age and sex distribution of the 126 patients who were found to have rectal polyps. Table 4 shows the racial distribution of this group.

From these figures, it is evident that polyps are more than twice as common in men as in women and that they can be found in any age group but are most common after the age of 40. Although exact figures on the racial distribution of our patient population are not available, it is estimated that we see approximately an equal number of Caucasians and Orientals. A preponderance of Caucasians with polyps over all other groups by more than three to one indicates that they are much more common in this group.

The number of polyps seen per examination is of interest. In 173 proctoscopic examinations, only 1 polyp was seen. More than 1 polyp was seen in 71 examinations, ranging from 2 to 6 or more. Typical polyposis was seen in two patients.

TABLE 3

Age and sex distribution of polyps

	21–31	31–40	41–50	51–60	61–70	70 and over	Total
Female	1	6	12	12	5	2	38
Male	3	21	21	30	10	3	88
Total	4	27	33	42	15	5	

TABLE 4

Racial distribution of polyps

	Caucasian	Japanese	Chinese	Others
Female	25	8	4	1
Male	71	12	4	1
Total	96	20	8	2

TREATMENT

In most instances treatment of the polyp was administered at the time of the proctoscopic examination. In some instances, when the polyps were inaccessible or many in number, hospitalization for treatment was advised. A number of the individuals in whom the polyp was discovered during the course of an executive physical examination were referred to their local physicians for treatment.

The type of treatment depended on the size and type of the lesion. A small sessile polyp was simply fulgurated. The larger sessile polyps were biopsied and then fulgurated. Pedunculated polyps were removed with a cutting snare and the base then fulgurated. A total of 359 polyps were treated, 263 of them at the time of the first proctoscopic examination. Of these 263, 142 were of a size that required only fulguration and 121 were either excised with the biopsy forceps or with a snare and then fulgurated. Ninety-six polyps were seen at subsequent examinations in these same individuals; 69 were fulgurated and 27 were excised and fulgurated.

PATHOLOGIC EXAMINATION

Only those polyps that were removed with a snare or with the biopsy forceps were available for pathologic examination and 108 reports regarding such lesions were made. Of these, 70 were reported to be simple adenomatous polyps, 29 were adenomatous polyps with cellular atypism and six were adenomatous polyps with carcinoma, Grade I, *in situ*. One villous papilloma of the rectum was seen. Two rectal carcinoids were identified and treated by fulguration. These figures do not include two patients with multiple polyposis. One executive patient was referred

to the family physician for treatment and one was proctoscoped at least 19 times, following subtotal colectomy.

Seventeen malignant lesions of the lower bowel were seen and have been previously referred to; 16 of these were adenocarcinoma and one was a lymphosarcoma of the rectum.

SUMMARY

Proctoscopy is a well established, well accepted part of a complete physical examination and the figures derived from this series of 2500 examinations support this position. It is an examination that has an unenviable reputation which should be combated in every way possible. A word of explanation to the patient regarding its importance and value will go a long way toward achieving its acceptance. Good equipment, particularly a properly constructed examination table, and gentle but persistent technique will facilitate the examination. Complete preparation of the bowel is preferred except for certain special situations.

In 2503 proctoscopic examinations, neoplasm—polyp, carcinoid or carcinoma—was found 262 times (10 per cent). In a selected group of Caucasian men between the ages of 40 and 65 there was an incidence of such lesions of 18 per cent in 50 examinations. Periodic re-examination of individuals who have already revealed the presence of polyps will be positive for new lesions approximately 40 per cent of the time.

Men are twice as likely as women to have rectal or sigmoidal polyps. These lesions are most commonly seen in the middle decades but can be found at any adult age. There seems to be a great preponderance in Caucasians as compared to the other racial groups seen in our practice.

Approximately one-third of the polyps that were examined histologically showed some degree of cellular atypism with at least six showing carcinoma *in situ*.

It can be conservatively concluded that proctoscopy is a valuable part of a complete physical examination whether performed for local symptoms or as part of a cancer prophylaxis program because it reveals neoplastic lesions of the rectum or sigmoid in approximately 10 per cent of individuals, a goodly proportion of which are either premalignant or frankly malignant.

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FASCIA LATA GRAFTS IN INGUINAL HERNIA REPAIR

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Judging from current literature, the use of fascia in the repair of defects of the abdominal wall has been largely replaced by the use of foreign materials such as tantalum, vitallium and stainless steel wire mesh, nylon, and so forth. Being of the old school that was taught that the body abhors a foreign body, I have not been enticed to use these newer materials to correct these tissue defects, even though experience has shown them to be comparatively free of producing adverse tissue reactions. For years, I routinely had a roll of tantalum wire mesh sterilized and ready for use when I anticipated that help from extraneous sources might be needed to close an abdominal wall defect, but it has never been used. This roll of wire either disintegrated from repeated sterilization or was conveniently lost by the nursing staff. Either way, as far as I am concerned, it was a good riddance. No doubt, cranial surgeons have come to place great reliance on various forms of metallic plates to replace skull defects, but I prefer fascia lata for closing the defects which I am called upon to treat.

The most important use I have found for fascia lata has been in repairing direct inguinal hernias. It has been used not infrequently in indirect inguinal hernias when the usual structures for repair are of poor quality, and this is most likely to be the case when attempts at previous correction have been unsuccessful. Large incisional hernias, whose surrounding tissues are attenuated or on which an unsuccessful attempt at repair has been made, are, in my experience, ideal indications for the use of fascia lata. Any condition in which it becomes necessary to remove the abdominal wall widely, such as in the extirpation of desmoid tumors, may furnish an indication for the use of fascia lata. Figures 1 to 3 are photographs of two individuals, and the method of repair used in one, in whom this situation was encountered after removal of desmoid tumors. Large sections of the abdominal wall were removed, leaving only skin and peritoneum. In the case of the girl, it has been 5 years, and in the man 7 years, since these fascia grafts were done, and recent examination has shown no evidence of abdominal wall weakness in either. The man is a carpenter and daily is required to do heavy lifting.

We have used fascia lata to repair chest defects, as advocated by Urban,[6] after the removal of the internal mammary chain of lymph nodes in association with radical mastectomy for carcinoma of the breast. Before becoming a more limited type of general surgeon, I used fascia on occasion in treating fractures, especially fractured patellas, and in suspending kidneys.[7] Nowadays, my urologic colleagues raise their eyebrows at the thought of such a procedure. However, I still believe there are definite, although perhaps limited, indications for this operation. Even though my urologic judgment may have been deficient in indications for renal suspension, it gave opportunity to demonstrate the effectiveness of the operation, for a considerable experience with long-time follow-up has revealed no recurrences of renal prolapse and surprising as it perhaps may seem, some patients were relieved of their previous distressing symptoms.

Although facia lata has been used over the years for the correction of many and varied surgical conditions, I wish in this presentation to speak of its use particularly in the repair of inguinal hernias, laying emphasis on its advantages in the repair of direct inguinal hernias. As is well known, direct inguinal hernia occurs almost altogether in men, particularly in the later years of life, and it is the type of hernia most likely to recur after the conventional type of repair. It is also in this type of hernia in which the transversalis fascia is the most useful in repairing the defect when it is found to be an adequate structure, but in my experience at least, it is frequently for all practical purposes nonexistent. Had it been a competent structure to begin with, the hernia no doubt would not have occurred.

The decision to use fascia in hernia repair

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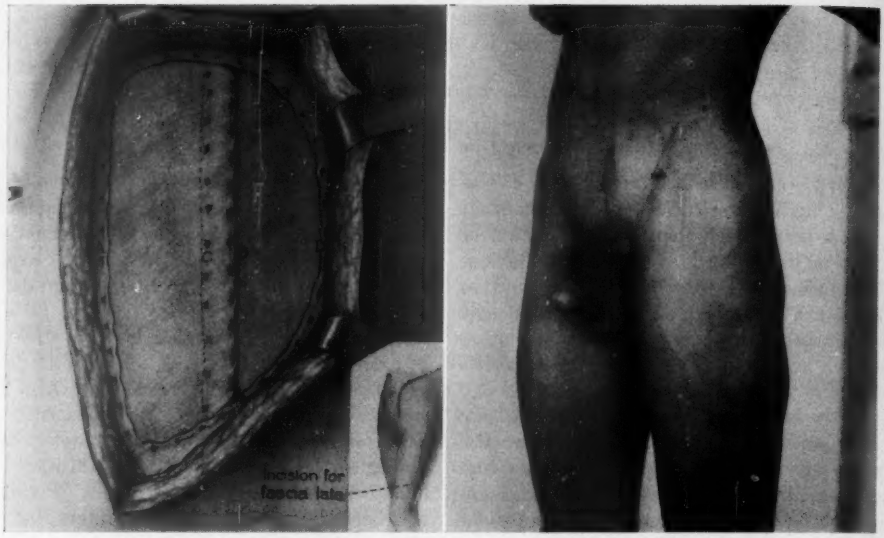

FIGS. 1 and 2. Photographs of patients from whom desmoid tumors of the abdominal wall were removed followed by reconstruction of the abdominal wall using fascia lata grafts. (Reproduced by permission of Ann. Surg., *139:* 335, 1954.)

in my experience has been based on the age of the patient, the adequacy of the local structures available, the type of work the individual expects subsequently to engage in, and whether or not the hernia has recurred after previous attempts at repair.

METHOD OF REPAIR WITH FASCIA LATA

The operation is preferably done under spinal anesthesia. The usual inguinal incision is made. The fascia of the external oblique muscle is incised parallel to and about 1 cm. above Poupart's ligament from the external ring to above the region of the internal ring. The cord is mobilized and elevated with the use of a hernia tape. Excess structures surrounding the cord, such as fat and dilated veins, are trimmed away, and in elderly individuals it may be desirable to remove the testicle and cord as this permits a more nearly complete closure of the defect.

If the hernia is indirect, the sac is mobilized and opened, the index finger inserted into the peritoneal cavity, and the area of the inguinal canal palpated from its inner side to determine the presence of a direct hernia or possibly a femoral hernia. The sac is excised high and the opening closed with atraumatic chromic catgut. Interrupted silk sutures, either no. 3 or 4, are used in the remainder of the repair. If the hernia is a direct one and large, the sac is opened and excised, care being taken not to injure the bladder which lies medially and posteriorly and is usually intimately adherent to the sac. If there is any doubt of where to incise the sac, an incision is made through the peritoneum above the internal ring and the index finger inserted and carried down into the direct sac so that it can be accurately identified. The sac is then excised and closed as well as the opening that was made above the internal ring. If the sac is small and the hernia appears to be mostly protruded bladder, it may be unnecessary to open the sac.

An attempt is next made to find the transversalis fascia which if of sufficient quality is sutured to the undersurface of Poupart's ligament (fig. 3). The internal oblique muscle is of no significance and is usually not used in the repair.

A piece of fascia lata of adequate size is now obtained from the upper lateral part of the thigh (fig. 4) and placed beneath the cord (fig. 5). The fascial patch is sutured to the spine of the pubis, to Poupart's ligament; proximally it is split and drawn up beneath the fascia of the external oblique and sutured snugly about the cord. Medially and above, the graft is drawn up tautly and sutured beneath the external oblique fascia and the edge of the conjoined tendon.

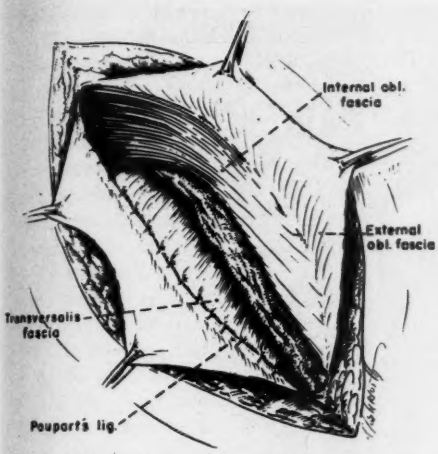

FIG. 3. Transversalis fascia has been sutured to Poupart's ligament.

The external oblique fascia is closed together above the cord. At times the transversalis fascia and the fascia graft have been sutured to Cooper's ligament, although I have not felt that this adds particularly to the adequacy of the repair.

OBTAINING THE FASCIA

Although it is a simple matter to get fascia from the leg, there are a few observations regarding this procedure that I have made over the years that may be worth mentioning. First, if it is thought that possibly a graft may be desirable, it is always best to have the leg prepared before the operation begins. If this is not done, one is prone to decide to get along without the use of a graft even though its use may seem desirable. It is helpful to hold the donor leg in internal rotation by the use of an adhesive strap over the foot attached to the opposite side of the operating table. This makes the upper outer aspect of the thigh more accessible. The fascia is thickest in the upper lateral part of the thigh and should be removed from just below the termination of the tensor fasciae latae muscle. After removal of the fascia, no attempt is made to close the remaining defect. Care in making the incision down to the fascia should be used because it is very easy to slice through the fascia. Such an injury can be repaired subsequently by sutures, but it is best to avoid it.

In earlier years, the graft was usually sutured beneath the internal oblique muscle, but more

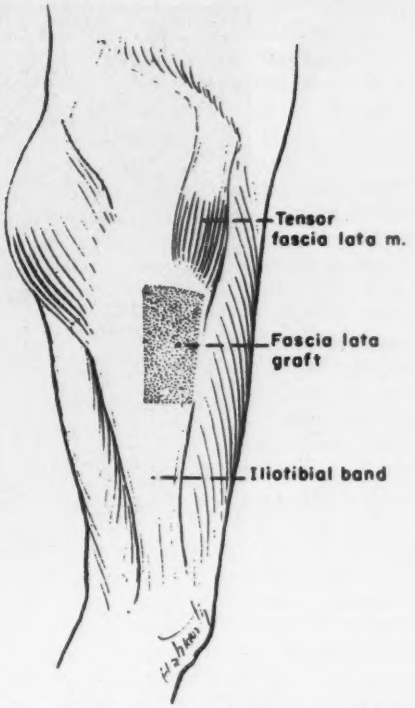

FIG. 4. Showing area in thigh from which graft is removed.

recently I have come to the conclusion that it is better to suture it beneath the fascia of the external oblique, as shown in figure 3. Bleeding points in the leg are ligated and then gauze is placed in the wound and the skin edges brought together with towel clips. This incision is closed later after the hernia repair is completed. Meanwhile, the minor oozing vessels have become sealed off. The wound is not drained. An elastic bandage is applied over the dressing. It may be necessary subsequently to aspirate serum from this area several times.

DISCUSSION

These observations and conclusions are based on 828 inguinal hernia repairs in which fascia lata was used 91 times. Of these repairs 30 were for indirect hernias, and 61 for direct hernias. This does not include the hernias operated on by other members of our group.

So far as I can determine, only three recurrences have followed the use of fascia. One occurred early

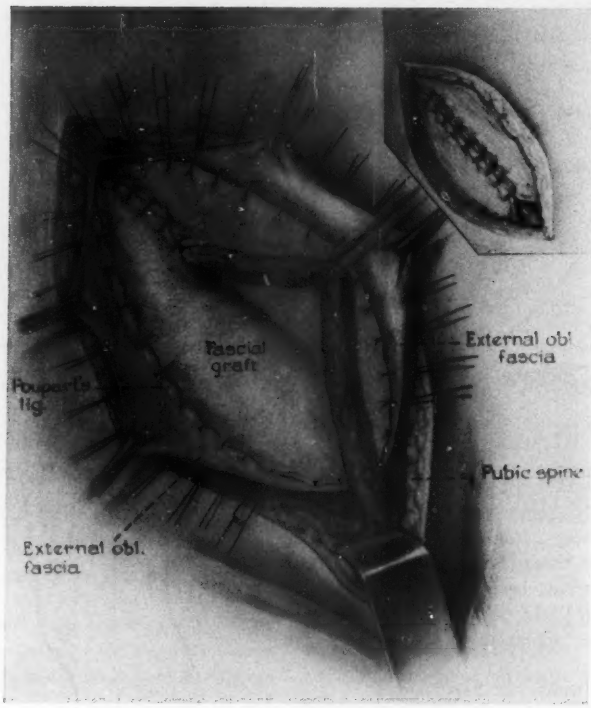

FIG. 5. Method of inserting the graft

in my experience when the amount of fascia obtained was not sufficient to close the defect.

Before the discovery of antibiotics, several fascia transplants became infected, leading me to conclude that such tissue devoid of its blood supply is more susceptible to infection than normal tissue. After the postoperative use of antibiotics, no case of infection has occurred. Meyers[5] has recently called attention to the misuse of antibiotics in inguinal herniorrhaphy, and no doubt his conclusions are well founded when considering the usual case of hernia repair. However, when a fascia lata graft is used, an exception seems to be justifiable.

It is impossible to determine accurately the recurrence rate after repair of inguinal hernias with the usual type of hernioplasty. It varies, no doubt considerably, with the experience and ability of the surgeon. It has been estimated that the rate when the usual type of repair is used is from 1 to 10 per cent in indirect hernias, and 10 to 25 per cent in direct hernias. In the cases in which I have thought it advisable to use a transplant of fascia, the recurrence rate is recognized to be high after the usual type of repair.

I am led to believe from a perusal of current literature and discussions with some of my surgical colleagues that results following the introduction of foreign material have not been as encouraging as earlier anticipated. Dales and Kyle[2] analyzed the late results of the repair of 46 large hernias where tantalum gauze had been used. There were 6.6 per cent recurrences in the inguinal hernias and 50 per cent recurrences in incisional and umbilical hernias. Fatigue fractures developed in all the metal gauze implants after 3 years, although the majority of these repairs remained clinically sound. However, they state that fragmentation of these implants can be of practical importance since they may penetrate into the peritoneal cavity, even into the wall of the underlying gut. Burton,[1] in comparing the use of fascia with the use of heterologous material such as tantalum, steel mesh and nylon, stated that in general the

employment of generically related tissues, such as fascia sutures or fascia grafts, has given the most satisfactory results. Recurrences have been fewer, and removal of wire mesh when recurrence does take place is a formidable procedure.

In my earlier experience with the use of fascia in the repair of inguinal hernias, I used the Gallie and Le Mesurier technique, that is, strips of fascia were used as sutures, uniting the transversalis fascia and the internal oblique muscle to Poupart's ligament. This method did not cover the area as completely as a transplant of fascia and has not been used by me for a number years. It was also found that the inguinal ligament was too greatly traumatized by the insertion of the large needles that were required. Reflecting a flap of the anterior rectus sheath to be sutured to Cooper's or to the inguinal ligament has been used a few times, but I have not become enthusiastic about this method of repair. It has seemed to me that a pedicle graft of fascia lata has little to recommend it. It is technically more complicated and I seriously doubt that its blood supply continues to function. I have had no experience with the use of skin grafts in the repair of hernias.

The defect in the fascia lata remaining after removal of the graft rarely causes disfigurement and leads to no loss of muscle function. Usually fascia re-forms to cover the defect. In only one instance in my experience has the patient been upset by herniation of the underlying vastus lateralis muscle that was still present 3 years after the fascia was removed. The defect was corrected for cosmetic reasons only. Foshee,[3] after a number of experiments on dogs and clinical observations in man, concluded that it is never necessary to suture layers of fascia lata across the defect from which a transplant has been taken or to make any effort to repair by one way or another the defect to prevent herniation of the muscle since this will be prevented by the newly formed regenerated fascia lata. He found that the more active an individual is, the more dense and better developed will be the regenerated fascia lata. At the end of 6 months to 1 year, the regenerated fascia will be of sufficient density and tensile strength to resemble normal fascia. Patients in whom a fascia transplant has been used are ambulated early, the same as if no transplant had been necessary.

Robert S. Smith[6] spoke before the Western Surgical Association recently on "Adjuncts in Hernial Repair." His experience and the experience of those who discussed this paper seem of sufficient interest to mention briefly at this time. Smith's report dealt with a 10-year experience with hernioplasty. During this time 339 patients had been treated in 108 of whom adjunctive techniques were considered necessary because of marked tissue deficiency. In 20 cases, the technique of Gallie had been used, tantalum mesh in 43, whole skin in 36, cutis grafts in 6 and nylon mesh in 3. He concluded that each type of prosthesis has its own peculiar surgical virtues and defects, but each probably has a field of usefulness. The first to discuss this paper was Chester McVay, who has been so much interested in this subject over the years. He said he had used a prosthesis in less than 1 per cent of cases of groin hernias. His experience had been with stainless steel mesh. He had found that the break up of the mesh began in about 1 year. He subscribed also to the magnitude of the attempt at removal of the mesh once it had become organized. McVay found it almost impossible to remove without taking out a section of the abdominal wall. The next discussant, Tom Throckmorton, favored tantalum gauze but admitted that no method of repair of hernias with or without a tissue substitute was free of recurrences. The next discussant, Herbert Nicols, had given up the use of nylon since some people were found allergic to it. Chester Guy had used tantalum mesh in 568 inguinal hernias or in about one-third of those repaired. In only 1 case had it been necessary to remove the mesh at a later date. There had been 1.76 per cent of recurrences when mesh was used and 4.7 per cent when not used. Carl Davis extolled the virtues of using a flap of anterior rectus sheath to strengthen Hesselbach's triangle and the so-called critical angle of the inguinal canal. This method he had found particularly valuable in cases of large recurrent inguinal hernias, and some direct hernias with inadequate transversalis fascia. Doctor Charles Johnston, Professor of Surgery at Wayne University, said that before this discussion closed someone should say a word for surgery in the cure of hernias. He had not used any prosthesis in the repair of hernias, and he had yet to see a case in which there is not enough tissue in the vicinity to give all the support one needs. His recurrence rate, if any, was

not stated. William H. Moretz' experience with metal mesh had not been with putting them in but with taking them out. This he had found to be a horrible mess when the hernia recurred and reoperation was indicated. He was of the opinion that the ideal substitute for body tissue when occasionally needed was Teflon.

The most interesting and unusual objection to these prostheses was voiced by John Grindlay of the Mayo Clinic. He said that polymer chemists are quite concerned that nylon will be depolymerized in time in tissue at body temperature, and it is quite possible that they will become carcinogenic or sarcogenic. Metallic implants he observed have a common fault in that they cause intense pain when the victim is in the field of radar waves or of any microwaves. These metallic implants act as antennae for such waves evoking heat in the surrounding tissues resulting in discomfort, even intense pain. He is of the opinion that in these days of ever increasing exposure to electronic apparatus, surgeons should be very wary about placement of metallic prostheses in patients, especially younger patients.

SUMMARY

From the opinions that have been quoted, it is quite evident that there is no unanimity of opinion regarding what type of prosthesis should be used if the surgeon feels that extraneous help is needed in the repair of abdominal wall defects. Opinions vary radically as to when or even whether it is necessary to use materials that are not available in the immediate vicinity of the defect. My observations over the years have led me to conclude that each surgeon must decide for himself what method of procedure in his hands gives the best results.

My experience leads me to believe that when it becomes necessary to reinforce a repair of an abdominal wall defect, fascia lata is the best material to use. It is easily procured and aside from the scar on the leg, no residual deformity or loss of function is to be expected. Being a homologous structure, fascia lata becomes a part of the tissues to which it is transplanted and is not subjected to the repellent forces to which foreign bodies are prone to be subjected.

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Book Reviews

The editors of THE AMERICAN SURGEON *will at all times welcome new books in the field of surgery and will acknowledge their receipt in these pages. The editors do not, however, agree to review all books that have been submitted without solicitation.*

Antibody Therapy for Staphylococcal Diseases. Edited by HENRY WELCH AND MAXWELL FINLAND, Editors. Medical Encyclopedia, Inc., Meigs Publishing Company, Indianapolis, 1959.

The purpose of this monograph is to act as a "practical guide for the physician in deciding where, how, when and why" to use each one of the antibiotics currently available for treating antibiotic-resistant staphylococcal infections. This reviewer feels that the book adequately achieves the role as a practical guide.

It is divided into eight chapters, the middle six each deal with a single antibiotic, *i.e.*, erythromycin, oleandomycin, novobiocin, vancomycin, ristocetin and kanamycin. The author of each of these chapters has had considerable clinical experience with the drug he is writing about and in addition gives a complete description of the pharmacologic properties of the drug. Thus, each chapter provides an excellent reference on the antibiotic for the practicing physician who is finding it increasingly difficult to decide which drug to use and when to use it in staphylococcal infections.

The last chapter, a recapitulation and discussion, is written by Doctor Finland. This is one of the most important chapters in the book, for in it he lists the antibiotics in order of potency *versus* severe staphylococcal infections. Without this list, one would have difficulty evaluating the relative efficacy of each drug after having read each chapter of the book. In addition, few physicians have enough experience with any antibiotic in such infections to evalute the relative effectiveness of the individual antibiotics for themselves. The relative importance Dr. Finland places on each drug may not be in agreement with the opinions of the other authors of the book who have presented the results of their individual experiences with an antibiotic. However, his suggestions are very helpful and will serve as an authoritative guide for the physician dealing with only an occasional serious staphylococcal infection. The use of the earlier antibiotics as penicillin, streptomycin, chloramphenicol, bacitracin, neomycin and tetracyclines in staphylococcal infections are also briefly mentioned in the first chapter by Doctor Welch.

This then is an excellent guide book for the selection of antibiotics in treating staphylococcal infections. It should be required reading for all physicians having to deal with staphylococcal infections.

RICHARD B. HORNICK, M.D.

Clinical Disorders of Hydration and Acid-Base Equilibrium, Ed. 2. By LOUIS G. WELT, M.D. Little, Brown & Company, Boston, 1959.

This text is the product of an internist. It is the impression of this reviewer that it is directed mainly toward internists—or on a broader basis, toward nonsurgical practitioners.

The division into separate categories of physiologic and clinical considerations is unique. It allows for an uncluttered approach to the fundamentals of chemistry at the laboratory level, and for those who seek a very basic approach to fluid and electrolyte problems, this method may be of merit. The disadvantages, however, are numerous. It is unwise to separate the problems hinted at from the living clinical examples. Much context of the first portion is forgotten and requires re-examination when the second portion of the text is studied.

Another undesirable feature is the profundity of the context of the physiologic section. It may well have been more properly titled "physical chemistry as applied to certain aspects of medicine." In this field there are many extremely complex problems, which in this text are described on occasion too incompletely. Stated otherwise, the basic knowledge required to understand the theories is taken for granted with too much liberty. This requires the reader to return to his college chemistry texts, or else requires a slow word by word progression in an attempt to comprehend and digest facts which have not been at his command for many years.

Diagrams are considered scanty in number, and of poor quality and labeling.

However, this section forms a fairly condensed reference source which attempts to limit the broad physiochemical field to conditions of importance in medicine.

In progressing to the clinical portion of the text, I must pause to give due credit to the completeness and number of references. It is reassuring

and gives insight into the thoroughness in preparing the text.

The second portion, entitled "Clinical Considerations," is certainly more enjoyable reading. Contained therein are innumerable "pearls"; however, they are so thoroughly scattered that it is difficult to relocate them unless one has defaced the text or is possessed with a photographic mind. Too often there is excessive material of lesser value cluttered before and after the salient thought.

Most gratifying throughout this section is the not infrequent reference, or rather admonition to the reader (internist ?), to consider the fluid and electrolyte problems more conscientiously and strongly before he shouts about possibly "drowning the patient." In general there is lack of mention of the often critical problems regarding hydration and acid-base balance which exists after pure medical care and before surgery. These problems occur sufficiently frequent to warrant their inclusion.

ALFRED W. GRIGOLEIT, M.D.

Surgical Treatment of Bone and Joint Tuberculosis. By ROBERT ROAF, W. H. KIRKALDY-WILLIS, A. J. M. CATHRO. The Williams & Wilkins Company, Baltimore, 1959.

This excellent book begins with a Foreword by Dr. Harold Boyd of the Campbell Clinic with whom it is easy to agree. The subject of bone and joint tuberculosis is covered thoroughly and no undue time is spent discussing still controversial points but, when controversy arises in treatment and the authors are aware of it they mention it. For example: the use of two or three antituberculous drugs is still in question in this country as well as in Kenya. The use of joint resection in the lower extremity or in the upper extremity is quite unusual in this country for our way of life is such that we tend to favor stability. The book is recommended to all those who treat bone and joint tuberculosis and to those interested in the orthopedic approach to this disease. A better or more critical review of this subject will not be found.

A. GIBSON PACKARD, JR., M.D.